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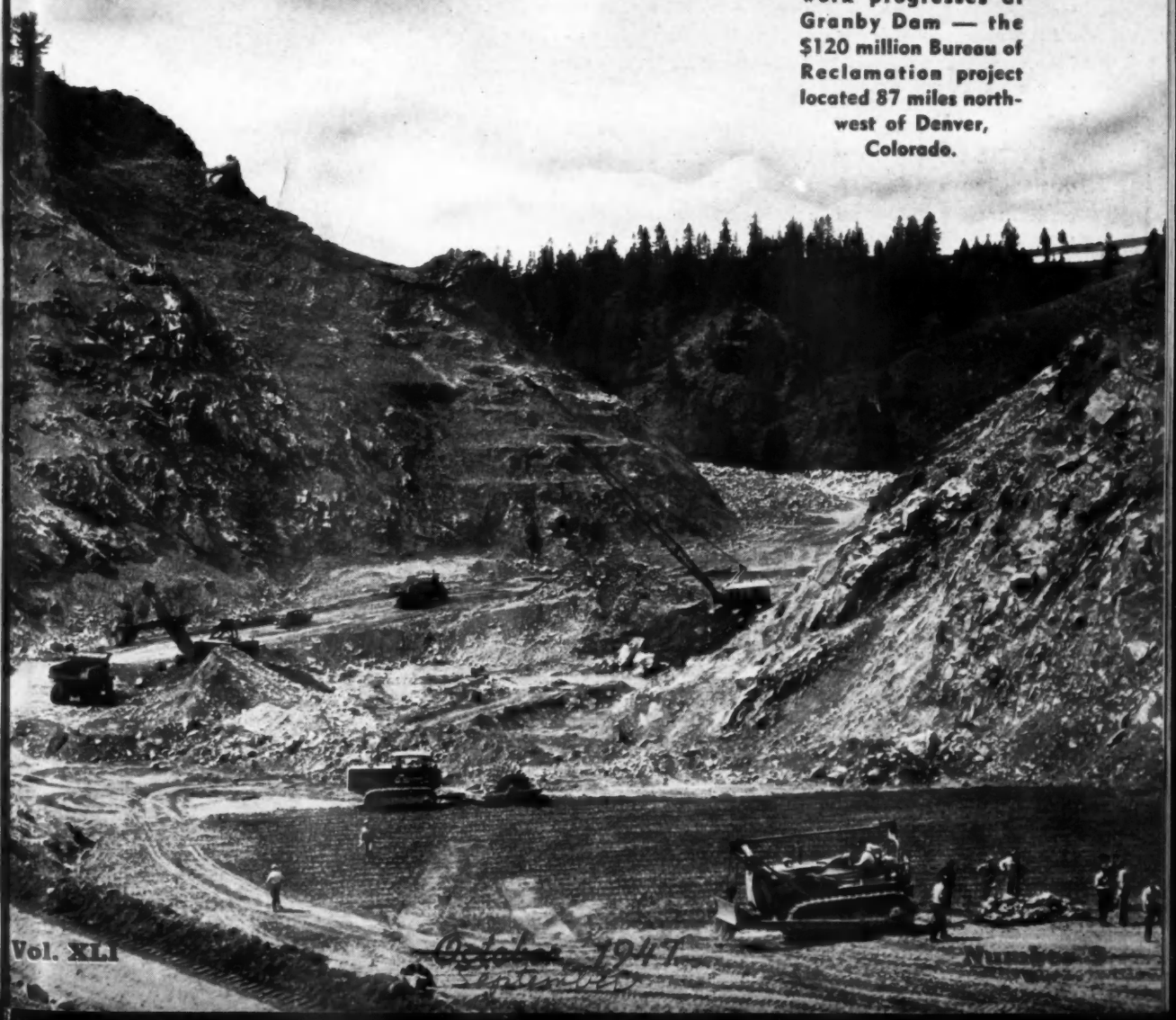
# EXCAVATING ENGINEER

FOUNDED 1905



Excavation and fill work progresses at Granby Dam — the $120 million Bureau of Reclamation project located 87 miles northwest of Denver, Colorado.

Vol. XLI October 1947 Number 10

# GETS IN AND WORKS *where others can't*

MANY jobs you'd ordinarily have to turn down — because of excessively low clearances and close quarters — are in the "routine" class when you're equipped with a Bucyrus-Erie DOZER-SHOVEL.

Look at the illustrations on this page . . . here are DOZER-SHOVELS at work in such "inaccessible" places as a warehouse, a tunnel quarry, a blast furnace . . . here, too, are DOZER-SHOVELS doing such "impossible" jobs as digging garages and basements under existing buildings!

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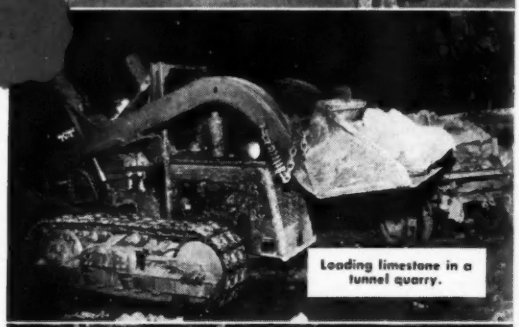
See your International Industrial Tractor Distributor for complete information about DOZER-SHOVELS for T-6, TD-6, T-9 and TD-9 crawler tractors. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

Handling fertilizer inside a warehouse.



Loading limestone in a tunnel quarry.

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Digging basements under buildings.

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# EXCAVATING ENGINEER

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## September, Advertisers


American Steel & Wire Co. ....581
American Steel Dredge Co., Inc. .....531, 577

Bethlehem Steel Company ....524
Blaw-Knox Company .....562
Bucyrus-Erie Company ..2nd Cover 529, 555, 567, 579

Columbia Steel Company .....581

Detroit Diesel Engine Division, General Motors Corp. .....557

Erie Steel Construction Co. ...574
Euclid Road Machinery Co., The.559

For Sale (Classified) .....583

Gatke Corporation .....568
General Tire & Rubber Co.....526

Haiss Manufacturing Co., Inc., George .....573
Hayward Company, The .....578
Harnischfeger Corp. .....522, 563

International Harvester Company .....552-553

Jahn Co., C. R .....577
Johnson Company, C. S....560-561

Koehring Company .....560-561

LeTourneau, Inc., R. G. ...532-533

Macwhyte Company .....521
M-R-S Manufacturing Co..4th Cover
Moon Mfg. Co. .....578

Northwest Engineering Co. ....525

Osgood Company, The .....570
Owen Bucket Company, The...576

Page Engineering Co. .....527
Preformed Wire Rope Information Bureau....3rd Cover

Roebling's Sons Co., John A....530
Rogers Brothers Corporation...575

Sauerman Brothers, Inc. .....572
Schield-Bantam Company, Inc...569
Sheppard Co., Inc., R. H. .....571
Standard Oil of California....565

Taylor-Wharton Iron and Steel Co. .....547

U. S. Steel Company .....581

Wayne Crane Division, American Steel Dredge Co., Inc.....531
Wellman Engineering Co., The..566
White Manufacturing Co. ....577
Wickwire Spencer Steel Division, The, Colorado Fuel & Iron Corporation .....528


## Contents


Vol. XLI No. 8 **September, 1947**



**Build Runways on Mud to Triple Mills Field—by M. R. Resnick** ..... 534

To increase the capacity of San Francisco's airport from 3,300 to 15,000 passengers daily and provide safe, new landing and takeoff facilities for 300-ton planes, the Guy F. Atkinson Company is excavating, moving 4½ miles, and placing 5,000,000 yards of earth at a million-yards-a-month clip.

**More Excavation in Panama?—by Ralph Z. Kirkpatrick** ..... 538

If the Panama Canal's Board of Consultants find for reconversion to an enlarged sea level canal (probably with tidal locks) unprecedented yardages, methods, costs, ($2.7 billion or more) and especially large dredges and shovels will be involved. New excavation would go down at least to El. —40 starting from places now as high as El. 600.

**Cellars, Sewers, and Silica** ..... 540

R. W. Sidley, Thompson, Ohio, sells "packaged basements" and a general excavating service over a 40-mile radius; operates a silica quarry and plant furnishing concrete sand, highway gravel, and stone for steel mills.

**They Moved a Million Yards of Rock—1000 Years Ago—by Dr. E. R. Harrington** ..... 544

A story of the "good old days" in America when rock was excavated by native Indians using crude stone hammers and fire followed by water; hauled by hand in wicker baskets. Turquoise, then as now exclusively an Indian gem, was the reason for generations of incredible labor—which modern machinery has made unthinkable today.

**Obituary—L. A. Stapley** ..... 546

**Equipment You Ought to Know About** ..... 548

**Shots from the Firing Line** ..... 550

Half-Year Report Shows Construction Down 11% .....550
"Return to Free Market is Orderly"—A.G.C. Survey ..550
N. J. Spent $30 Million on Roads Since War's End....551
Progress of NY's Thruway..551
Place Bertrand Levee Contract .....554
Construction Lack Pushes Up Maintenance Costs, ARBA Finds .....554
Unearth Prehistoric Relics in New England Excavation...554
Prepare to Accelerate Missouri Basin Work .....556
Construction Machinery Prices Rise 12% in Year...556
Set $12 Million as Maximum Montana Road Program....558
$4 Million N. D. Awards...558
Krug States Proposed Plan Would Bring Flood Control Benefits in Three Years....558
Announce Change in Georgia Road Awards Procedure....564
Seek Increased Federal Loan for Brooklyn-Battery Tunnel.564
New Bond Issue to Provide More South Carolina Funds.564
Insurance Figures Discount Safety of Super Highways..564
Tests Prove Expressways Save Gasoline .....566
Kentucky's 6-month New Road Bill is $13 Million...566
Gasoline Consumption in U. S. Reaches New Peak...568
Plan Rapid Placing of New Engineers Contracts .....568
Indiana Plans Intensive City Parking Survey .....569
Vermont Contracts Total $5 Million Since War .....569
Announce $21 Million Road Program for Massachusetts..570
Outline Progress on Columbia Basin Project .....570
Study Advisability of $2 Billion N. Y. Highway Plan...571
Authorize $7 Million Dam for South Wales, Enaland.....572
Make Final Selection of Routes for Interstate System .....573
Conduct Survey of Kentucky Roads Expenditure Program.575
Ask Use of Meter Revenue to Finance Parking Facilities..575

**Not in the Contract** ..... 580

**New Trade Literature** ..... 582

**Notes from the Manufacturers** ..... 584



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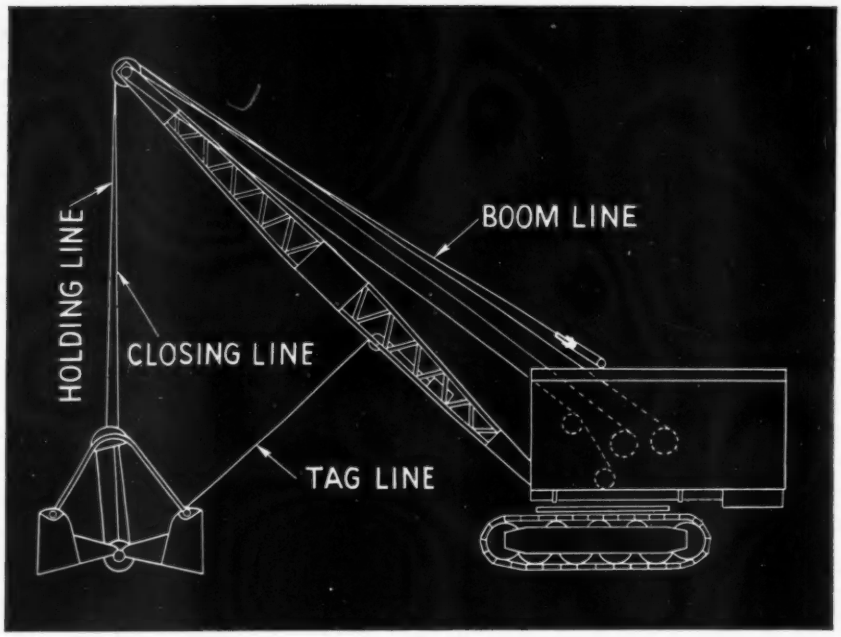
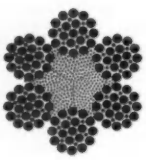
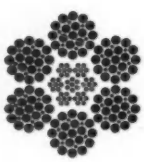



# Follow this guide in buying

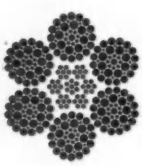
# Ropes for Clamshell Cranes



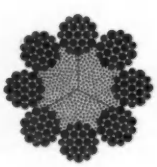
TYPE W
fiber core



TYPE W
independent
wire rope core



6 x 37 TYPE Q
independent
wire rope core



8 x 19 WARRINGTON
fiber core

Each rope on a clamshell crane has a specialized job, and your choice of lines has a direct bearing on rope life and performance. Bethlehem suggests that you use the following as a guide when considering wire rope for clamshells.

**HOLDING LINES** encounter relatively little wear or crushing. Bethlehem's 6 x 19 Type W Purple Strand with regular lay and fiber core is widely used. Form-Set (preformed) often specified.

**CLOSING LINES** are often subjected to severe bending and crushing. Good ropes for this service are the 6 x 19 Type W and the 6 x 37, choice depending upon the type of bucket. To help resist crushing, independent wire rope core may be required. We recommend Purple Strand grade, regular lay, Form-Set (preformed).

**BOOM LINES** are rarely subject to heavy wear. A Purple Strand 6 x 19 Type W rope, regular lay, will do a good job for you here. A fiber core is often used, but independent wire rope core gives added protection against crushing.

**TAG LINES** need unusual flexibility and elasticity. Generally plow steel rope with regular lay and fiber core is used. 8 x 19 is suggested for small cranes; 6 x 19 Type W for large ones.

If further details are required, ask for the services of a Bethlehem engineer. He'll be glad to help with your wire-rope problems, at no cost to you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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You'll also be getting in on the "ground floor" because, until recently, there has never been an economical way to handle small, scattered dirtmoving jobs. Today, however, with the new high-speed "D" Tournapull, a self-powered, rubber-tired Scraper, one man can handle a number of small jobs per week . . . collect a good price for each job . . . develop an attractive business or side-line with a really promising future. Best of all, this versatile new tool eliminates the need for power shovel, trucks, flatbed trailer, drivers and operator formerly necessary to mechanize small dirtmoving operations.

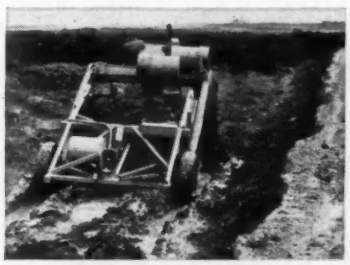
## $12,000 gets you started

You can get a new 3-yard "D" Tournapull delivered to your door for less than $12,000 complete. Less than $25 per day pays your operating cost for this one-man dirtmover, leaving you plenty of room for profit.

Be first in your locality to offer this profitable new service. See your LeTourneau Distributor today for a FREE DEMONSTRATION.

### Handles multiple jobs

High speed lets you handle a number of small jobs per week. Your only competition is a pick and shovel gang or power shovel with a couple of trucks.



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### Counties

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### Cities and Towns

$ Grading streets for new subdivisions . . . landscaping around parks, golf courses and cemeteries . . . grading airport runways . . . covering garbage dumps . . . snow removal.

### Builders

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### Industries

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LETOURNEAU PEORIA, ILLINOIS — HIGH-SPEED UTILITY — TOURNAPULLS

# Build Runways on Mud to Triple Mills Field

**To increase the capacity of San Francisco's airport from 3,300 to 15,000 passengers daily and provide safe, new landing and takeoff facilities for 300-ton planes, the Guy F. Atkinson Company is excavating, moving 4½ miles, and placing 5,000,000 yards of earth at a million-yards-a-month clip.**

By M. R. Resnick

THE huge airplanes of today, and the mammoth flying ships of a few years from now, have created an enormous earthmoving job for the West Coast excavating industry. To accommodate "everything that flies" at their Mills Field airport, the people of the City and County of San Francisco voted $20,000,000 in 1945 to pay for expanding the facilities of the field.

Besides a new terminal building and other related installations, it was necessary to add almost a thousand acres to the total size of this bay-side airport, and to triple the useable acreage. The airport had to be raised from five feet above sea level to eight feet above sea level. The shape of the field had to be changed from irregular to an elongated X, with two pairs of dual runways. Traffic capacity had to be increased from 3,300 to 15,000 passengers daily. And the number of airplane movements possible in an hour were to be increased from 30 to 120, with the size of aircraft unlimited.

### For 300-Ton Craft

To finish these tasks, and thus to create "aviation's doorway to one half the population of the world," the Guy F. Atkinson Company is now involved in moving five million yards of earth an average distance of 4½ miles from the borrow pit to the expanding airport. Their job is to supply a dirt fill capable of supporting aircraft weighing 300 tons —in spite of the fact that 60 to 75 feet of mud underlie the terrain of the air field.

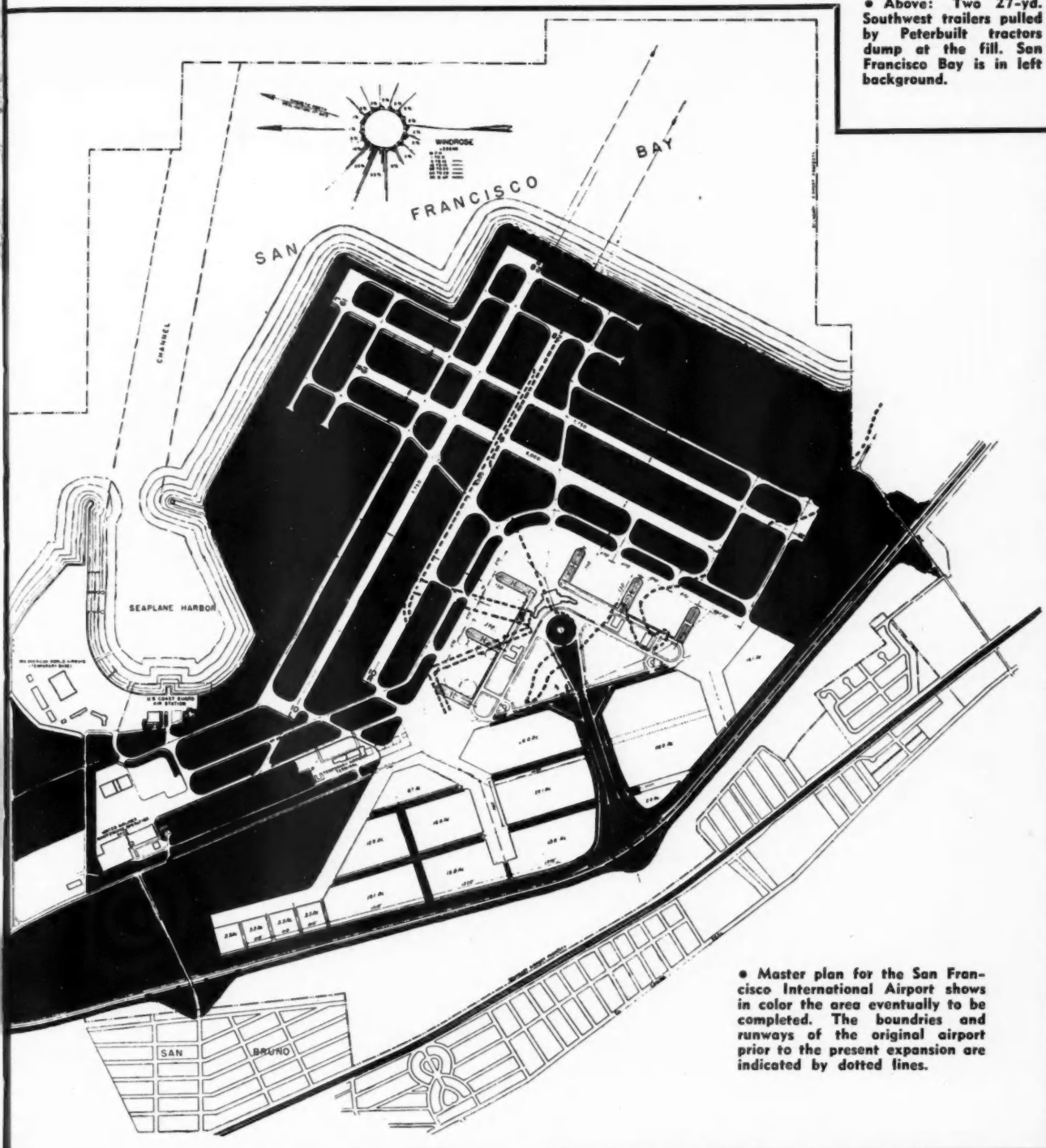
Atkinson is the second to gain a Mills Field contract. The company was preceded by Macco-Morrison-Knudsen, who were low bidders on the first sections of the big airport job. Atkinson's is the final, $3,722,000 slice of the earth-moving phases of the airport expansion. The bid price was 65.7 cents per yard.

### Borrow Pit Arrangement

The contractor is using dirt from Macco-Morrison-Knudsen's borrow pit (see account of the Macco-Morrison-Knudsen operations in "Moving a Mountain Into the Sea," *Excavating Engineer*, March, 1947), under an arrangement whereby Atkinson pays the pit owners 6 cents per cubic yard. This royalty payment includes the use of the three mile haul road

• At the borrow pit, two Bucyrus-Erie 120-B shovels with 6-yd. dippers load to Utility and Southwest trailers pulled by Peterbilt tractors

• Above: Two 27-yd. Southwest trailers pulled by Peterbuilt tractors dump at the fill. San Francisco Bay is in left background.




• Master plan for the San Francisco International Airport shows in color the area eventually to be completed. The boundries and runways of the original airport prior to the present expansion are indicated by dotted lines.

• Panoramic view of the borrow area. Four 6-yd. shovels are on the main bench with smaller shovels above. The airport fill area is in right background.

and the three overhead bridges which were especially constructed for this project by the original contractor. But some of the operating methods used by the two companies differ, just as experts always are bound to differ on phases of their specialty.

### Fill in Bay

The Atkinson job, specifically, is to bring 2,400,000 yards from the hillside borrow pit to fill in a portion of San Francisco Bay, on the edge of which the present airport is situated. The other 2,600,000 yards is largely lift work on existing bayside acreage.

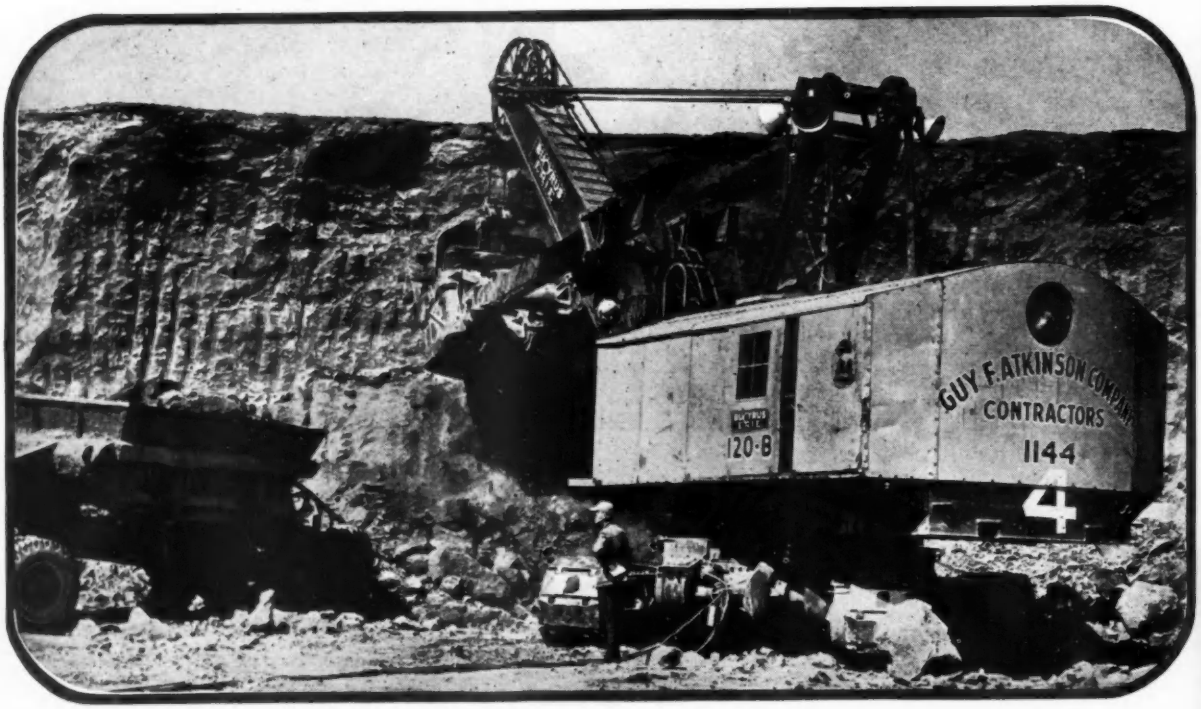
Work like this takes big machinery and there were only two bidders for the contract. The Atkinson Company is using four 120-B Bucyrus-Erie shovels with 6-yd. dippers as their principal excavating equipment, assisted by one Bucyrus-Erie 54-B shovel with 3-yd. dipper and one 80-D Northwest 2½-yd. shovel.

The hauling is being done by 30 Peterbilt tractors with 27-yd. Southwest trailers; 12 Peterbilt trucks with 22-yd. Utility trailers and 295 h.p. Hall-Scott gasoline motors, and 20 assorted diesel and gas trucks, mostly 17-yd. Peterbilts and 12 to 14-yd. bobtails. The Southwests were especially designed for this downhill haul, and were used by Macco-M.K. on the preceding contract.

### Auxiliary Equipment

Other heavy equipment includes 12 D-8 Caterpillar tractors; 4 Caterpillar-12 graders for road maintenance; one 100-ton Southwest pneumatic roller; five water trucks, to keep down heavy dust, including two Westerns of 4500 gallon capacities, one Sterling of 3000 gallon capacity, and two Ford-V-8 Highway size; two 80-D Northwest draglines, to do mud removal work on the fill, and 3 Caterpillar scrapers, besides miscellaneous smaller equipment. The company is experimenting with several makes of tires, and keeping records on the performance of all equipment.

There is a 6½-yd. dipper on one of the 120's, a 6-yd. on the three others, and a 3-yd. dipper on the 54-B. Results to date have




• A 6-yd. dipper bites into the bank to feed a hungry Southwest trailer at the borrow pit.

been fewer passes per truck higher total output, and increased total digging capacity. The operators, long experienced in shovel work, are using due care to prevent serious overloading of the excavators as a result of the oversize dippers.

Shovels are operated in a breasting-in position, loading from both sides, instead of the merry-go-round type of loading.

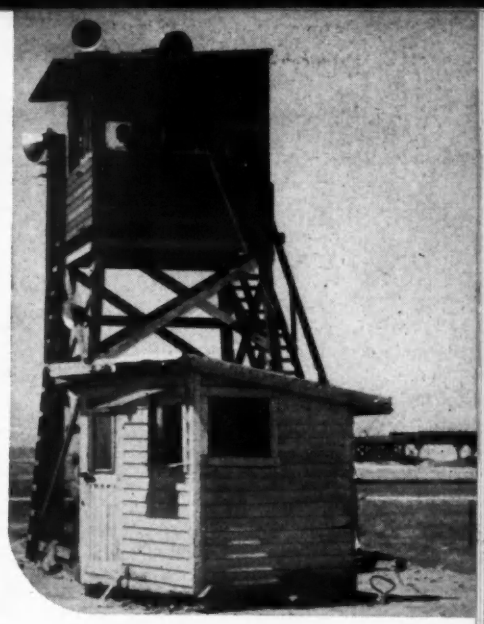
### High Speed Haul

All the hauling equipment is working satisfactorily. The Peterbilt Hall-Scott tractors show particular ability. Forty-five miles an hour on the haul road from the pit to the fill is not unusual for these heavy-laden vehicles. They make up in road speed any minutes that might be lost in end-dump unloading. The bottom dump trucks have been discovered to be the fastest unloaders for this type of job but of necessity the contractor is using both bottom dump and end dump rigs.

Each truck makes several trips per hour. A special checking tower at a midpoint on the haul road clocks each truck on its way to and from the fill, so that each day's end supplies the company with complete data on the performance of both personnel and equipment, making it possible to spot trouble and to institute improvements where needed.

The mountainside borrow pit is being worked from the top of the hill down, where trucks and shovels take the earth in 25 foot benches, a 25-ft. face at a time. In order to remove the required yardage, eight benches will have been cut through by the time the job is done. By employing this benching operation, the dirt is handled only once, before it is speeded on its way to the fill. The pit is largely composed of a fairly hard solidified silt. Sufficient power has been installed by the Pacific Gas and Electric Company to make it possible to work the four 120 B's at once.

Since Macco-Morrison-Knudsen are currently working in the same area on a Bayshore Freeway contract for the State of California, both companies are using the borrow pit at the same time. They have agreed on a line of demarkation so that the equipment of one does not interfere with the other. The efficiency of the haul road is attested by the fact that for a time there were over 100 trucks on the road, at the height of Atkinson's and Macco's operations, without a single serious accident.



• Midpoint on the 4½-mile haul, a checker clocks each truck on its way to and from the fill. One of the overhead bridges which carry the hauling road over the main highway is seen in right background.

### Mud Pushed Out

In the bay-fill phases of the job, a mud wave is gradually pushed ahead of the fill by the earth brought from the borrow pit.

On the lift work, 12″ lifts range from a total of two feet to eight feet. The 100 ton pneu-

*(Continued on page 562)*

Above: A full 22-yd. load speeding to the fill in a Utility trailer drawn by a Hall-Scott powered Peterbuilt tractor passes a Caterpillar 12 motor grader busily dressing the first class hauling road.

Right: As one of the big shovels receives its regular greasing (right background), three of the job's top men pose for the photographer: from left, Slim Conley, superintendent, Joe Canto, Swing shifter, and R. W. Atkinson, Project Manager.

# More Excavation in Panama?

• Slides have always been a severe problem in Panama Canal construction and maintenance. This photo, taken in 1914, shows the Panama R. R. SS Ancon making the canal's first transit on August 15 as one of three Bucyrus-Erie 13½-yd. dipper dredges removes fallen material at Cucaracha slide.

**If the Panama Canal's Board of Consultants find for reconversion to an enlarged sea level canal (probably with tidal locks) unprecedented yardages, methods, costs ($2.7 billion or more) and especially large dredges and shovels will be involved. New excavation would go down at least to El. —40 starting from places now as high as El. 600.**

**By Ralph Z. Kirkpatrick**
**Major, Officers Honorary Retired List, AUS.**

JUST a month ago, one of our proudest national possessions — the Panama Canal—completed a third of a century of vital operation. In 1938 the 100,000th commercial transit was made and the accumulated tolls collected exceeded the initial construction cost. By 1964 it is believed the canal's capacity (calculated to be 150% of today's normal) will be reached.

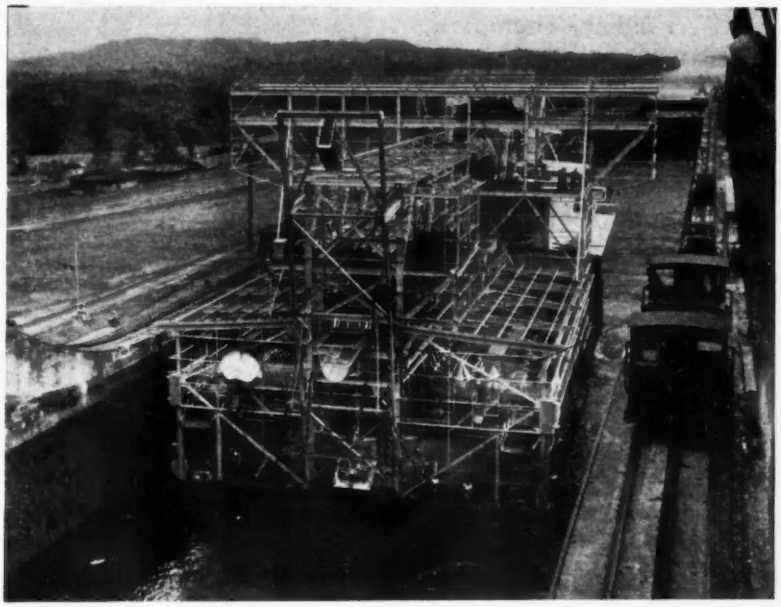
In two World Wars the waterway vindicated its strategic role in world affairs. For instance, after the Pearl Harbor debacle its quick passage to the Pacific of naval reinforcements was highly vital to the Allies, and especially the United States.

Ingenious Seabees and the canal force made some near-miracle transits during the recent war. Crippled and battletorn vessels were given temporary Canal Zone repairs and passed on to safer and better-equipped Atlantic yards. Two giant 124-ft. beamed floating steel drydocks, badly needed by Admiral Nimitz's fleet, were careened on their sides, becoming 10-story-high structures, and were push-pulled through the 110-ft. wide lock-chambers. Frequently parts of vessels were burned off by means of torches to permit passage of the locks. But no one could devise a way to pass the too-wide and too-long SS Normandie or the British transports, Queens Elizabeth and Mary; and some of our own Navy units.

World War II caught the Panama Canal in the earlier stages of a $277 million defense and (a larger) Third Locks modernization construction program on which about $70,000,000 was expended, mostly in excavation. Due to manpower and material shortages almost all this work was stopped late in 1942. Looking back, this stoppage was providential; now the lessons of the war can be incorporated into the enlargement and modernization.

To this end, under the requirements of Public Law 280 of 1946,

• **MAJOR KIRKPATRICK, a veteran of 35 years of engineering work—mostly on the Panama Canal — serves as a voluntary advisor on Canal Zone problems, although confined to his Rochester, N. Y., home as a semi-invalid. His most recent work has concerned suggestions for the Navy's so-called Terminal Lake Plan of Panama Canal Reconversion.**



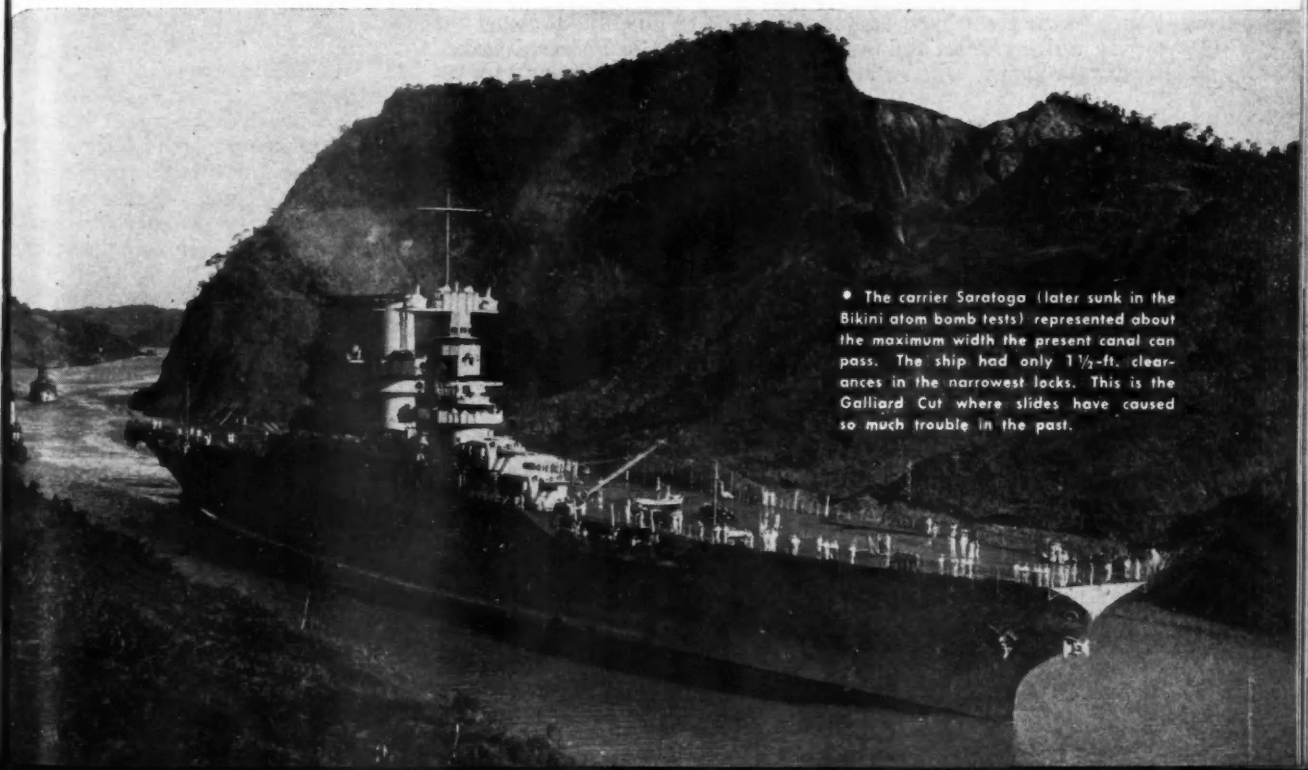
• Official Panama Canal photo shows one of the largest two tin mining dredges ever built in the United States—the Bucyrus-Erie-built Stuyvesant—entering Gatun Locks on the 15,000-mile tow from Florida to the Netherlands East Indies. (Story in July, 1947, Excavating Engineer.)

an exhaustive overall study is underway, and Canal Zone Governor Joseph Mehaffey must submit his recommendations to the President and Congress by December 31, 1947. Under the leadership of Corps of Engineers Col. James Stratton, a large force of engineers is pushing the work in the field, testing laboratories and marine basins, and designing offices.

### Consider 14 Routes

Various alternative routes and plans have been or are under consideration. In all, 14 route-sites (most of them once under consideration in the American isthmian canal studies of the 1870's and 1898-1906) have been restudied, for their possibilities for a sea-level or lock alternate canal. They range from the Tehuantepec Isthmus of Mexico to the Atrato River in Colombia, with several in the Republic of Panama. Apparently the work is now narrowed down to sites and routes in the Canal Zone, on or near the present Canal channel. Most favored present plans are: (a) Reconversion, approximately on the channel lines, of the present Canal to sea level (i.e. drop down to El.-40 bottom level) with tidal locks on the Pacific side. This is an adaptation, with modernization details, of DeLesseps' attempted construction in 1880-1885 and it would likely involve Third Lock construction and use during the estimated 10 to 20-year construction period. (b) The so-called Duval or Terminal Lake Plan would continue most of the present structures (particularly on the Atlantic side) but would build *all new* Pacific locks, at a site westerly of present ones at Miraflores (Miraflores Lake would become a ship-anchorage basin at Gatun Lake's level, with a three-stage stepdown lock to the Pacific). (c) A reconversion, after the styles of either (a) or (b) with an additional but separate sea-level canal at one of the alternative sites (probably partially in the Republic of Panama in an enlarged Canal Zone).

*(Continued on page 576)*



• The carrier Saratoga (later sunk in the Bikini atom bomb tests) represented about the maximum width the present canal can pass. The ship had only 1½-ft. clearances in the narrowest locks. This is the Galliard Cut where slides have caused so much trouble in the past.

# Cellars,

**R. W. Sidley, Thompson, Ohio, sells "packaged basements" and a general excavating service over a 40-mile radius; operates a silica quarry and plant furnishing concrete sand, highway gravel, and stone for steel mills.**

THE nickel came to rest in the phone box with a medium-pitched "ping." It was hot in the booth so I folded the door open and the top light went off.

"I'd like to talk to R. W. Sidley, at Thompson, Ohio," I told the long distance operator. "Better make it person-to-person, he really gets around the country."

It had been nine years since I'd seen Mr. Sidley. He had two ⅜-yd. 10-B's then. One of them was just beating a thunderstorm out of a basement in Painesville; the other was finishing a road grading job 16 miles away. The operator located him quickly and he told me one of his current machines, a ½-yd. dragshovel was digging a basement — you've guessed it—in Painesville, from where I was calling.

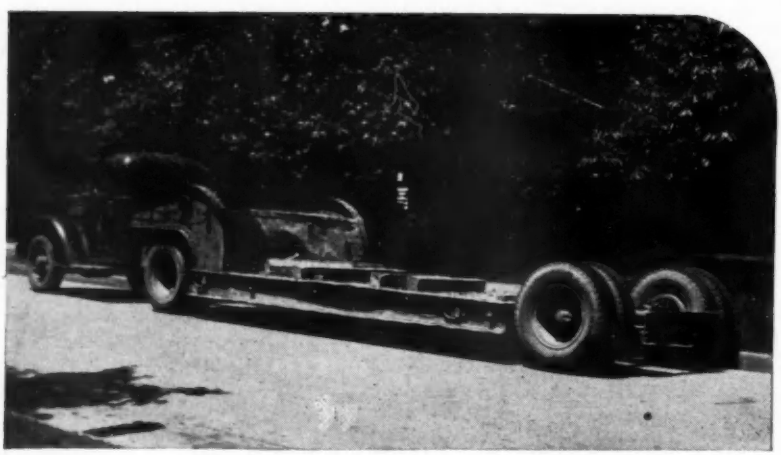
"King and Liberty Streets," he said. I'll be here at the Silica Plant all afternoon if you want to come down." I told him I did and went back to the car where Eddie Doyle was waiting. Man and boy, Eddie has probably taken more pictures of excavating equipment than any other photographer now clicking a shutter.

• The first step in a Sidley "packaged basement" is excavation of the sewer trench, shown completed and ready for laying of pipe in the picture at right. Above: The dragshovel has completed a "pioneer" cut along the complete front line of the basement and has started one side wall. Basement dimensions are 24 x 28 x 5.

### Basement Started

We found the dragshovel all right, nestled against a lot line and among piles of excavated dirt and clay. There were no signs of life, not surprising since it was 12:30. A trench about five feet deep and three feet wide had been dug from about the middle of the street back to where the front of the basement had been established by a single cut of the same depth. We decided the operator had gone to lunch and looked the job over a little. The area staked out for the basement was 24 x 28-ft. As evidenced by the cuts already made, material was dirt for about two feet below the surface and clay from there down. It was all wet, Painesville having had the general weather. The operator had beveled the upper edges of the trench and the basement cut to keep the dirt from sliding in. It was a nice, clean-looking job, though we wondered what was going to be done with the excavated material.

• The dragshovel is moved over a 40-mile radius on this Rogers trailer pulled by an International truck.



### Lunchtime

Across the street and about three houses down, a man was just getting out of a car. I went over and asked him if he knew where the dragshovel operator was. He didn't, but as I walked back across the street, there, sitting in the shade and closing his lunch box, was the operator, Harry Bartle. A pile of dirt had hidden him from us. I was sure Eddie and I hadn't said any but good

things about the job so I went up and introduced myself and Eddie.

Harry has been with R. W. Sidley for 11 years and was polite enough to say he remembered my former visit. He told us the owner of the lot figured he'd sell the dirt from the excavation himself, so it was just being stockpiled. We asked Harry how long it would take to finish the job. He told us he wasn't sure, but he'd dug a little larger one (28 x 28 x 4½) the day before in 1¾ hours, complete with sewer trench.

He put out his cigarette and started the 15-B going, moving toward the back of the lot, cutting the west wall of the basement and about half its width as he worked back. He could really handle that machine. Eddie took some pictures and we took off for Thompson, or rather for the Sidley quarry and Silica Plant which is about 3 miles south of town on Ohio Highway 528.

### Ran Farm and Quarry

Back in 1933, a precarious time for anyone to start a business, Mr. & Mrs. Sidley bought a farm with a good silica deposit on it. They ran the farm, Mr. Sidley loaded gravel with a used Byers Bearcat crane, hauled it in a Dodge truck and trailer, and began a combination of farming, quarrying and contracting which has grown steadily ever since. In the early days, Mr. Sidley told me, he and his truck drivers would get up early and do the farm chores before starting a full day's work on the quarry and contracting business. Today, he is still a "working" executive, as evidenced by the fact that we found him running a bulldozer, leveling space for a new stone stockpile.

He can, and often does, operate one of the clamshells at the Silica Plant, which is being expanded and changed to fit into the carefully planned operation Mr. Sidley is working toward. Looking ahead to the times when business may not be as easy to get as it is now, he is planning a set-up of good modern machinery which will have the capacity and flexibility to do varied jobs economically. The difficulties of getting new equipment during and since the war have slowed up the achievement of the desired equipment team, but the Sidley organization has not had idle time on its hands.

### Contracting Work

At present the contracting work is handled with two machines, the ½-yd. Bucyrus-Erie we saw at Painesville and a ¾-yd. Bucyrus-Erie currently on rental as a clamshell on an asphalt job. This machine is operated by Ladd Vlcek who has been with Sidley since 1937. Two Rogers trailers, one a tandem axle rig, are used to move these machines over an area with a radius of about 40 miles from Thompson. The trailers are hauled by International K7 and KS 8 trucks. The contracting work, in addition to rental, consists largely of highway grading, placing highway stone

and

• Silica rock in the Sidley quarry is uneven in formation; lies in layers averaging 12 to 20 feet deep. At the right of the picture are the Cleveland rock drill and Gardner-Denver compressor used in drilling; the ½-yd. Bucyrus-Erie shovel and one of the three 1½-to 2-ton International trucks used in loading and hauling.

• Above: A truck-load of silica starts through the preparation plant. Haul from quarry to plant is about one quarter mile.

• Above: The office and 20-ton Howe scale where the trucks are weighed out.

• Below: One of the 15-ton Truck Engineering semi-trailers gets a load of road gravel from the ¾-yd. Bucyrus-Erie clamshell. The boom of the second crane is behind a Barber-Greene conveyor and Hardinge ball mill.

• Above right: Part of the 24-in. x 75-ft. Barber-Greene conveyor which delivers pebbles to a 60-ton hopper from which they are loaded to cars for shipment to steel mills. This conveyor is loaded by a ½-yd. Bucyrus-Erie clamshell.

• Bottom left: Mr. Sidley himself; at the controls of the Caterpillar-mounted LaPlante-Choate bulldozer. He's grading an area for a new stock pile.

• Right: Part of the washing and screening plant. Current production, 600 tons per day; planned capacity 100 tons per hour.

• Below left: Concrete sand and highway gravel are loaded direct to trucks or semi-trailers by this ¾-yd. clamshell.

• Below right: Still in its Army cab, this ½-yd. 15-B loads pebbles. Mr. Sidley plans to replace the two cranes with a 1½-yd. Bucyrus-Erie 38-B whose reach and capacity will handle the whole job.

—usually from the Sidley plant—trucking, and basement work. The 15-B is mainly used on the latter, and currently averages five to six basements per week. Approximately 80% of the basements dug run between 125 and 200 yds., with 20% being larger.

### "Packaged Unit"

Where it is not necessary to haul material away, the competition of bulldozer-dug basements is met by offering what might be called a "packaged unit," consisting of basement, sewer trench and, in the country, septic tank. Basements proper are dug at 75 cents per yard for everything under 200 yards. If material is hauled away, an additional charge is made for trucking. Trench and septic tank work is handled at the rate of $10 per hour. Most of the basement jobs are obtained by reference from satisfied customers. Both ½ and ¾-yd. machines have shovel, dragline and clamshell attachments.

The Silica rock in the quarry is uneven in formation and lies in layers averaging from 12 to 20 feet in depth, with a maximum range up to 30 feet. Drilling is handled with a DR-14 Cleveland rock drill powered from a 315-ft. Gardner - Denver compressor. Where the rock is less than 12 feet thick it is snake holed. The bulk of the drilling is handled in two benches with the average hole running 18 feet and the maximum, 30 feet. Hercules and Du-Pont explosives are used; 40% gelatine in wet holes, and 40% ammonia dynamite in dry. From one to 35 holes are fired per blast, the wide range being due to the formation which is creviced so the stone commonly is in a flat-iron shape. Enough holes are fired in each blast to get a kick-back to the next crevice. Where the rock is hard, drilling averages a foot per minute with a 3-in. bit. Softer stone, strangely, means slower progress.

### "Sticking" Solved

One of the major problems in this quarry was to keep the bits from sticking. Several methods were tried before the present one was developed. An air line under constant pressure from this compressor is put through a ⅜-in. pipe and follows the bit down, and this has successfully kept the hole blown out.

Stone is loaded by the second of the three Sidley ½-yd. Bucyrus-Eries. Three 1½ to 2-ton International K-6 dump trucks haul the stone about a quarter mile to the crushing plant. Output is governed by orders and plant capacity. Current production is running about 600 tons per day, with present plans calling for that to be stepped up to 100 tons per hour soon. The quarry shovel is operated by Arthur Cooper, who has been a member of the organization since its beginning in 1933.

### Plant Products

Three principal types of stone are turned out by the plant: highway gravel, concrete sand, and pebbles used in making ferro-silicon. From the quarry, material is dumped on a 2-in. grizzly which feeds a 15 x 36 Pioneer crusher. A Cedar Rapids feeder delivers it then for scalping to a 3 x 8 Tyler-Niagara screen using 1½-in. mesh. Unwashed road gravel can be drawn from a bin below this screen. If the material is to be washed, it goes to a 4 x 10 Tyler Tyrock double-deck screen with ½-in. mesh on the top deck and 3/16 in. on the bottom.

Material passing over the top screen goes directly to a stock pile. The minus 3/16 in. material is concrete sand. The plus 3/16-in. goes to a second 4 x 10 screen with a ¼-inch screen. The plus ¼-in. material can be stockpiled

*(Continued on page 578)*

• Close-up in the quarry. The block at the right, hooked over the dipper teeth, is used as a skull-cracker in breaking oversize.

# They Moved a Million Yards of Rock – 1000 Years Ago

**A story of the "good old days" in America when rock was excavated by native Indians using crude stone hammers and fire followed by water; hauled by hand in wicker baskets. Turquoise, then as now exclusively an Indian gem, was the reason for generations of incredible labor —which modern machinery has made unthinkable today.**

**By Dr. E. R. Harrington**

A MILLION cubic yards of rock is not a very large excavating job today. Modern excavators have air drills, dynamite, mucking machines, endless conveyor belts, power shovels, trucks, electric trains, and many more machines to help

• **Top: New Mexico's Cerillos Hills are manzonite porphyry—laccoliths with the sediments stripped from them.**

• **Above: The cliff side of Mt. Chalchihuitl (located 25 miles southwest of Santa Fe) showing caved-in 150-ft. pit and old entrance to underground workings.**

• **Left: Close-up of ancient Indian excavation in cliff face. More than a dozen skele were removed from the rubble.**

• **Photos Below: Indians placed dry wo underground ledges as shown to heat with fires for several hours before do with water to crack the rock. Stope are blackened from fires built hundred years ago.**

them get the job done. The modern worker has many horse power at his command. He is, literally, the commander of a thousand slaves.

But it was not always so in America. Back a thousand years ago rock was excavated without any of these machines. In the five hundred years preceding the discovery of America, some native American miners were taking out a million yards or so of very hard porphyry without benefit of drill, pick, or shovel. It was a stupendous task and is worthy of a place in the annals of American mining.

**DESPITE its "good looks," Turquoise is virtually unknown today except as a component of American Indian jewelry produced in southwestern United States and in Mexico. The gem is usually set in hand-hammered silver rings, bracelets and necklaces by craftsmen whose "know-how" has been handed down through the centuries. Classed as a semi-precious stone by jewelers, its chalk-like softness is considered unsuited to use in modern jewelry. Similar to sardonyx and less valuable than coral, turquoise is very nearly robin's-egg blue in color, usually containing veins of black, grey, or white impurities.**

The Indian village of Tunque is now just a pile of rubble 40 miles northeast of Albuquerque, New Mexico. Back in the days when Saladin and Richard the Lion Heart fought in Palestine, Tunque was the mining center of America. The mines were a few miles away on the edge of a low laccolith known as Mount Chalchihuitl. Here the Indians of the mud village of Tunque had found the blue and green veins of turquoise. With crude stone hammers they had broken away pieces of the gems and had used them in trade with the surrounding tribes.

### Early Gem Traffic

The gem traffic grew in importance and the next two hundred years saw the village extend its markets to the entire southwestern part of what is now the United States and even on into the interior of Mexico. By the time Cortez arrived in Mexico (1519) the Indians were making regular trips between Tunque and Mexico City, some fifteen hundred miles away, and the blue stones of the north were extensively used as beads by the Incas.

The early Indian miners at first worked only in open pits. With their stone hammers they pounded at the outcrops hour after hour. For every ounce of turquoise many pounds of gangua had to be disposed of. The waste

**Below: Some of the ancient Indian belongings found in the stopes. The stone hammers, some of them weighing as much as 5 pounds, were often used in the hands without a handle. The pinion log served as a ladder—tree-ring records give it an age of about 1300 A. D.**

**Below Right: Abandoned camp five miles northeast of Mt. Chalchihuitl housed Tiffany Co. turquoise miners between 1890 and 1915.**

**• Right: The late Prof. P. L. Schmidt showing a sample to a visitor during uncovering of the old Indian workings.**

**• Top: A modern worker in one of the active mines near by chips out a small turquoise stringer.**

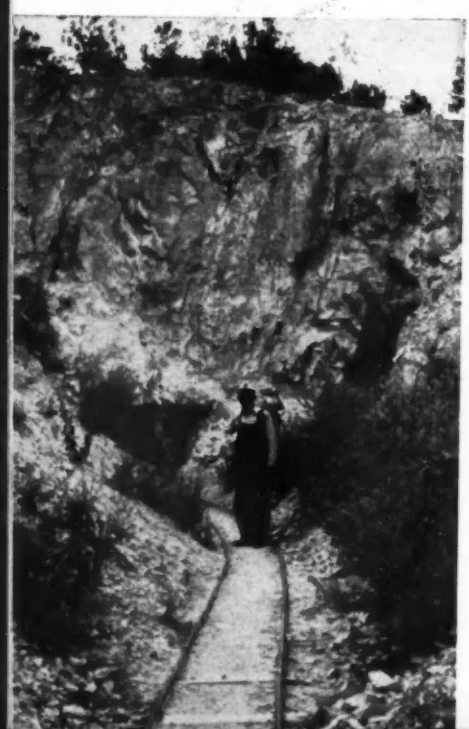
rock was carried out in wicker baskets and buffalo skin bags, and dumped on the lower slopes of Mount Chalchihuitl. Year after year the patient work went on and the pits grew deeper and deeper. On the upper sides of the mountain the cliffs grew higher and higher and finally the miners began to work their way back under the cliffs and out of the light of day. Wherever the stringers of turquoise led, there the Indians would follow as best they could.

### Crude Methods

The Indians had no metal tools, no drills, and of course no explosives. They beat at the porphyry with huge stone axes attached to sticks or held in the hands, alone. They built fires against the cliffs and after prolonged heating, dashed water upon the hot rock to shatter it and make it yield to their crude tools. Down and down the miners went. Farther and farther back under the cliff they burrowed until by the time Coronado arrived in 1540 the excavations had a ground area as large as a football field and their high sides were framed by cliffs a hundred feet high.

And in the meantime the "mining princes" of Tunque had grown arrogant. Their mud village was proud of its three story communal apartment house and its large meeting house, or "kiva." No doubt they charged excessive prices in corn and beans for their blue stones. Perhaps their poorer neighbors were jealous of the more fortunate. At any rate the village of Tunque was attacked, sacked, and burned and left with scarcely one stone upon another. Archaeological investigations of tree rings set the date of the destruction at about 1500.

*(Continued on page 579)*



• Prof. Smith, who drove a new tunnel into the old workings in the south pit, is shown along the track which he ran through the rubble of the ancient dump.

## L. A. Stapley

Lorel A. Stapley, 48 year old prominent Phoenix business man, died on Sunday, July 20th, in a Phoenix hospital after being stricken with a heart attack earlier in the day.

Mr. Stapley was Secretary-Treasurer and Sales Manager of The O. S. Stapley Company, Arizona's largest hardware, farm implement and industrial equipment firm, and widely known in those fields throughout the nation. He was born in Mesa, Arizona, August 13th, 1898, the third son of the founder of the Company, O. S. Stapley. He received his education in Mesa schools and at Brigham Young University in Provo, Utah.

When he was sixteen years of age he first became associated with the family business, serving as a clerk in the firm's Mesa store. Two years later he became manager of the Phoenix store and served in that capacity until he was promoted to the position which he held at the time of his death.

He was instrumental in the expansion of the firm from one store in Mesa, Arizona to a system of retail stores in seven towns: Phoenix, Mesa, Glendale, Chandler, Buckeye, Coolidge and Casa Grande, Arizona, and a wholesale division in Phoenix, the Arizona Hardware Company, which is the largest wholesale hardware firm in the state.

Mr. Stapley was widely known as a business, civic and fraternal leader. He was a past president of the Phoenix Kiwanis Club, past vice-president and director of the Phoenix Chamber of Commerce and a director of the Central Arizona Light and Power Company. He was on the board of directors of the Young Mens' Christian Association and the Good Samaritan Hospital. A member of the Church of Jesus Christ of Latter Day Saints, he took an active part in its affairs. In addition to being chairman of the enlistment committee of the Second Ward Church in Phoenix, he served for nine years as president of the Church's Stake Sunday School.

His survivors are his wife, Mildred Azola Pomeroy Stapley; two daughters, Patricia Sue Stapley, Phoenix, and Mrs. Lloyd A. Bimson, Prescott; two sons, Dr. Lorel A. Stapley, Jr., Roanoke, Virginia, and D. Thomas Stapley, Phoenix. He also leaves three sisters, Mrs. Zola Deshler, Mesa, Arizona, Mrs. Clayton Hakes, Safford, Arizona, and Mrs. Cleo Johnson, Downey, California; five brothers, O. Glenn, Delbert L. and Thyrle H., all of Phoenix, L. Erwin of Mesa, Arizona and Wayne C. of Chandler, Arizona, all of whom hold official positions in the O. S. Stapley Company. Three grandchildren also survive.

# New tin dredges "*Roosevelt*" and "*Stuyvesant*" equipped with

# *TISCO MANGANESE STEEL BUCKETS

TISCO Integral Type Dredge Buckets were first used in 1933 by the Netherlands Companies for their older dredges on the islands of Billiton and Banka. Since then they have been adopted by other tin and gold dredging companies throughout the world, and in certain operating conditions have proved to be more productive and lower in maintenance cost than other types.

TISCO Integral Type Buckets are cast in one piece, of the famous wear-resistant TISCO Manganese Steel. There are no old lips to scrap—no new lips to buy—no rivets to remove and replace. Occasional lip rebuilding by welding with *TISCO-Timang Weld Rod quickly, easily, inexpensively keeps TISCO Integral Buckets in service at full capacity.

## Write for NEW FOLDER

which shows all types of TISCO Dredge Buckets for gold, tin and platinum dredging, and gives details of Integral, Rivetless and Riveted designs, various pin-locks and other construction features.

**● These two giant dredges were designed by the Bucyrus-Erie Company, and assembled at Tampa, Florida, for the Mining Equipment Corporation of New York, to be operated in the placer tin fields in the Netherlands East Indies.**

*TISCO registered trademark

*TIMANG (registered trademark) U. S. A. Patents 1,732,202, 1,902,395, 2,026,468, and foreign patents.

**Taylor-Wharton Iron and Steel Company**

**High Bridge, N. J. Easton, Pa. U. S. A.**

Offices in Baltimore, Chicago, Charleston, W. Va., Detroit, New York, Pittsburgh, San Francisco

**Founded TW 1742**

Represented in London, England, The Hague, Holland, Malayan Union and Netherlands East Indies.

# *Equipment* you ought to KNOW ABOUT

### Portable Water Carrier

*Manufacturer*: The Dixie Cup Company, Easton, Pa.

*Claims*: This new portable water carrier is designed for use on construction jobs, by survey crews, railroad maintenance crews, etc. It may also be used in manufacturing plants, steel mills, and mines, wherever drinking water is not readily available.

The unit is made of stainless steel and is insulated to keep water cool for many hours in the field. A recessed faucet turns off

automatically when released. A lug is provided for a paper cup dispenser.

Each drink is served in a paper cup, eliminating the chance for mouth-borne contagions.

### Air Compressor

*Manufacturer*: Davey Compressor Company, Kent, Ohio.

*Claims*: A complete new line of two-stage, air-cooled industrial air compressors of 60, 105, 160, 210, 315 c.f.m. capacities is now in production.

Known as "Air Chief Industrials," these machines feature permanent peak efficiency valves and a new "Equi-Balanced" crankshaft which is said to reduce compressor vibration. The use of this crankshaft, coupled with employment of rubber vibration mounts, makes possible the elimination of heavy mounting bases and facilitates the moving of units from one location to another.

### "Mobil-Powr" Unit

*Manufacturer*: Munton Manufacturing Company, Franklin Park, Ill.

*Claims*: The Munton "Mobil-Powr" unit has been developed to reduce the time and labor required for maintenance, repair, and production operations. Foot-actuated, the unit permits the operator to keep both hands free during work.

The standard machine consists of a seven-ton hydraulic jack with three-inch ram stroke, a foot-power pump mechanism, and an eight-foot hydraulic line with swivel coupling.

### Cable Terminals

*Manufacturer*: Macwhyte Wire Rope Company, Kenosha, Wisconsin.

*Claims*: "Socketype Cable Terminals," formerly made by Paulson & Nardon, Inc., Los Angeles, are now being manufactured by Macwhyte Company. The terminals consist of an alloy steel cadmium plated eye or fork type fitting, plus a stainless steel sleeve for swaging to cable. They are available loose or attached to the cable in a complete assembly to specification length.

### Power Distribution System

*Manufacturer*: General Electric Company, Schenectady, N. Y.

*Claims*: A fully co-ordinated power distribution system, including a sub-station for stepping down the voltage used by electric shovels, is now available. The system is supplied as an integrated "power package," providing speed, flexibility, and safety in the working of strip mines.

The use of a single feeder unit sub-station mounted on skids greatly facilitates the over-all stripping operations, because the sub-station is moved easily from one place to another as conditions change in the mine.

### "Moto-Scraper"

*Manufacturer*: LaPlant-Choate Manufacturing Company, Incorporated, Cedar Rapids, Iowa.

*Claims*: The new "Moto-Scraper" is a high speed tractor-scraper combination, consisting

of a two-wheeled rubber tired tractor joined to a 17.5-yard scraper by a pedestal hitch assembly to form a single integral self-propelled unit. It is designed for digging, loading, transporting, and spreading dirt and other material on either long or short hauls.

The tractor is equipped with a 225 HP diesel engine and extra large 21:00 x 29 tires. It has four speeds forward and one reverse. Top travel speed is 18 miles per hour.

The scraper is a positive forced ejection type, operated by an air-actuated cable power control unit, mounted on the rear of the tractor and deriving its power from the main engine. Steering is handled by two hydraulic jacks which are positively controlled by a Fluid Power Unit mounted on the front of the tractor.

### Diesel Trucks

*Manufacturer*: General Motors Corporation, Detroit, Michigan

*Claims*: A complete new line of diesel trucks, including eight models and two engine sizes, is now on the market. Horse power

of both four and six cylinder engines has been increased approximately 21 per cent, and major improvements have been made in the chassis. Frame side rails are parallel throughout, widening the front axle track by ten inches. A heavier I-beam has increased front axle strength 32 per cent, and new toggle type clutch linkage requires 50 per cent less effort to disengage the clutch.

### Two-Wheel Air Compressors

*Manufacturer*: Le Roi Company, Milwaukee 14, Wis.

*Claims*: The new Model 85 Le Roi "Airmaster," available with 2-wheel or skid mounting, is now in production.

Powered by a valve-in-head engine, the unit features replaceable cylinder sleeves, precision bearings, pressure lubrication, and magneto ignition. The compressor, built integrally into the

engine block, is liquid cooled. Electric starting and electric hourmeter are supplied as standard equipment.

### Anti-Rust Paint

*Manufacturer*: Speco, Incorporated, Cleveland, Ohio.

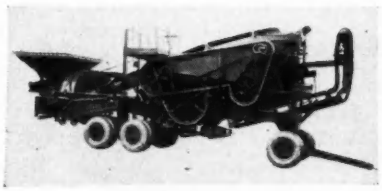
*Claims*: "Rustrem" anti-rust paint is now available in aluminum as well as in black. This new paint, according to the manufacturer, can be applied right over rust without brushing or scraping. It is reputed to immediately penetrate the rust layer, render it inactive, and seal the surface against further rusting. Other features claimed are high resistance to chemical action and immunity to climatic changes.

### Steam Hose

*Manufacturer*: B. F. Goodrich Company, Akron, Ohio.

*Claims*: An improved "Burst-Proof" steam hose has been announced. The company says the principal improvement lies in the fact that the tube and cover do not harden as much after prolonged exposure to steam at the high pressures which are now being used in many installations.

After exposure to steam pressures of 145 to 225 pounds for prolonged periods, it is claimed that the tube and cover of the new hose showed more than 30 per cent improvement in the amount of original elongation retained.



### Portable Gravel Plant

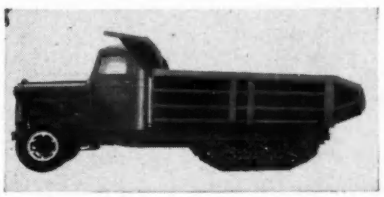
*Claims*: The new 34-S "Continuflo" portable gravel plant is described as a high aggregate producer. Simplified in design, and readily moved, the 34-S is recommended for quick, short job hops where material is required in a hurry. It meets state highway load limits and dimensions.

The plant has a 7-foot hopper, equipped with mechanical feeder at the rear end. Processed material is delivered from the front end. Two men are required to operate the 34-S—one on the dragline or shovel, the other on the plant itself.

### Linn "Haftrack"

*Manufacturer*: The Linn Manufacturing Corporation, New York, 19, N. Y.

*Claims*: Designed for heavy-duty industrial hauling, the new D-15 Linn Haftrack incorporates



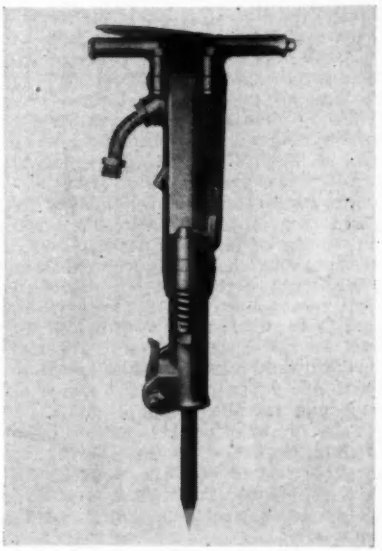
the following basic design features: Full contour traction for maximum engaged track area and increased stability, new long traction unit for greater load capacity and track area, higher speeds, a choice of gasoline or diesel power.

Varying body styles are available for contracting, oil drilling, cane hauling, mining, logging, snow removal, and general industrial work.

### Arc Welders

*Manufacturer*: The Harnischfeger Corporation, Milwaukee, Wisconsin.

*Claims*: A complete new line of AC arc welders is now in production. The new machines are said to offer a number of unique features. All are supplied with P&H "Dial-lectric" control. This simplified control eliminates the need for moving coils or cores, worm gears, sprockets, and chain or lever adjustments. Current selection is made simply by turning a single dial which covers the full welding range of the machine, from minimum to maximum capacity.



### "PB-8" Paving Breaker

*Manufacturer*: Ingersoll-Rand Company, Phillipsburg, N. J.

*Claims*: An article describing the Ingersoll-Rand PB-8 Paving Breaker, on page 354 of the June 1947 issue of *Excavating Engineer*, was inadvertently illustrated by a picture of the Ingersoll-Rand J-30 Jackhammer. The correct illustration of the PB-8 appears above.

Suitable for heavy-duty demolition work, the PB-8 Paving Breaker weighs 82 pounds and is equipped with a new kicker-port valve for greater efficiency and striking power.

# *Shots* from the FIRING LINE

## Half-Year Report Shows Construction Down 11%

At the close of the first half of this year, construction volume as measured by contracts awarded was 11 per cent below that reported for the corresponding six months of last year in the thirty-seven states east of the Rocky Mountains, according to the F. W. Dodge Corporation.

Gains in the first two months of this year were offset by a decline beginning in March. The sharpest drop was in non-residential contracts, which were down 23 per cent at the close of June 30. Residential building volume fell off 10 per cent while public works and utilities construction showed a 9 per cent gain over the first six months of last year.

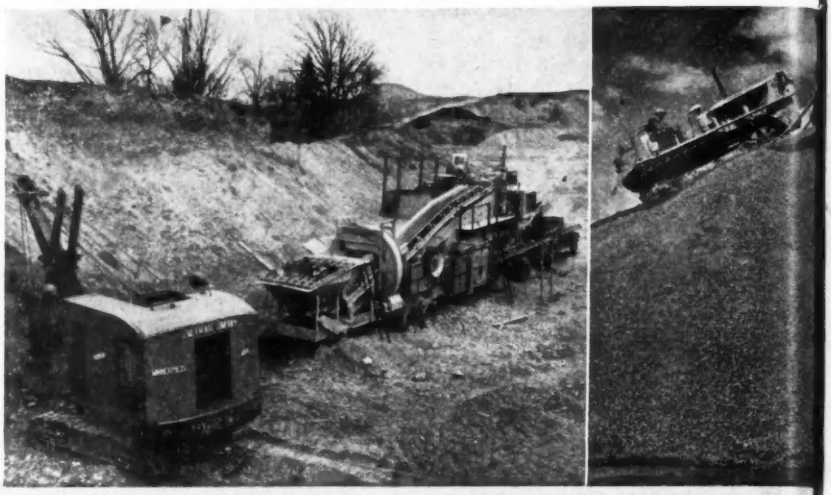
During the first half of this year, contract valuations totalled $3,492,645,000 against $3,937,736,000 in the thirty-seven states in the first six months of 1946. Residential volume totalled $1,468,902,000 against $1,633,473,000 in the first six months of last year. This year's residential contracts called for the building of 187,019 dwelling units against 234,315 in the corresponding period of last year.

Non-residential building contracts declined from $1,517,262,000 in the first six months of last year to $1,165,631,000 in the first half of the current year.

While the declines were general in most areas of the country, they fluctuated from an over-all drop of 32 per cent in the Upstate New York and northern and eastern Ohio areas to gains of 70 per cent in the states of Louisiana and Mississippi combined.

Publicly owned projects figured more prominently in the volume reported for the first half of this year than in the first six months of last year. Contracts for projects classified as publicly owned represented 30 per cent of the first half year's total as compared to 20 per cent in the first half of last year.

Publicly owned residential projects for which contracts were let in the first six months had a valuation of $121,990,000 against $55,362,000 in the corresponding period of last year. Publicly owned non-residential awards totalled $224,690,000 this year up to the end of June and $105,242,000 in the first half of last year.



• **Loading directly to a Universal Uni-Crusher (both primary and secondary units combined in one machine) is this Link-Belt Speeder ¾-yd. shovel, shown working on J. W. Craig Company's gravel pit operations near Osseo, Minn. The Caterpillar D-7 tractor with Caterpillar bulldozer is used on the same job to stock-pile and spread gravel, strip overburden, build hauling roads, doze gravel down to the shovel, and move the crusher to new locations.**

## "Return to Free Market is Orderly"—A.G.C. survey

"The return to a free market in the construction industry, after nearly six years of federal control in one form or another, is being accomplished in an orderly manner," according to The Associated General Contractors of America.

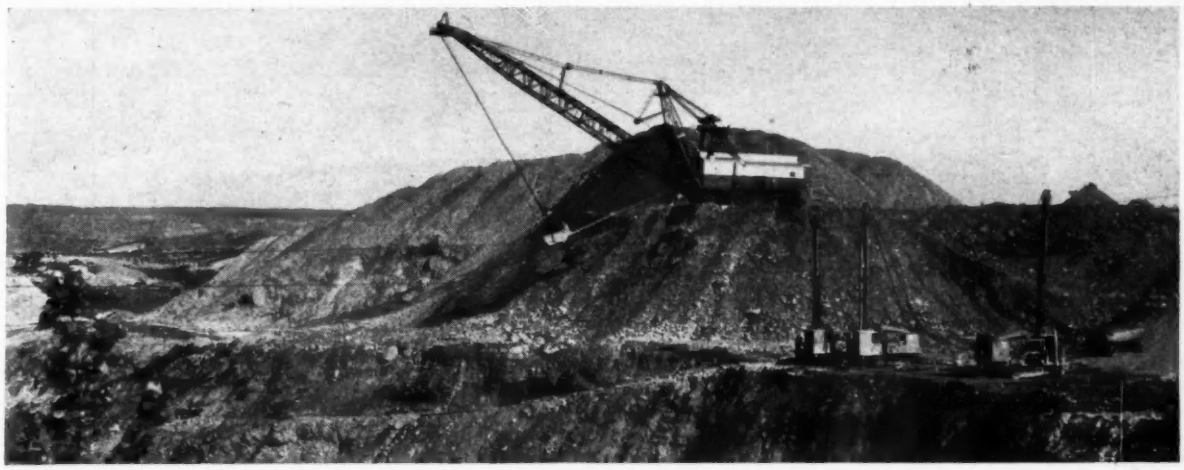
The managers of building chapters of the association—which has nearly 4,300 large scale general contractor firms as members—were asked in a survey what increase, if any, they had noticed in the amount of factory, store, office building, and institutional construction in the first 15 days since federal limitations on this type of work were completely removed. Construction controls, with the exception of those on amusement and recreational projects, were lifted on July 1 by the Housing and Rent Act of 1947.

The majority of AGC chapter managers noted no large or general immediate increase in industrial, commercial, or institutional construction, but were optimistic about the outlook for the months ahead. "The indications are that the volume of non-residential construction, long held back by federal control, will increase gradually as local problems of labor and materials shortages are solved and costs are stabilized," according to the A.G.C. report.

"In some areas these problems appear to have been answered satisfactorily and construction volume has already increased. Chapters in California, Indiana, Maryland, Michigan, Montana, North and South Carolina, Ohio, Oregon, Pennsylvania and the District of Columbia report a substantial rise in the amount of work underway. Some other areas report small increases in construction volume.

"Residential construction seems to be

• **A fleet of 12-yd. Euclid wagons pulled by Cummins-diesel-powered Euclid tractors lines up at a Potholes Dam borrow pit to obtain material being placed by Lytle, Amis and Green. The $9 million dam, fourth largest in the nation, will require more than nine million yards of earth and rock. The site is near Moses Lake and Warden, Washington.**



• Large diameter blast holes have proved highly effective in the tough overburden of Pennsylvania's anthracite fields. These three Bucyrus-Erie 42-T's can put down 9-in. to 12-in. hole. They are owned by the Correal Construction Company, as is the 25-yd. 1150-B dragline on the higher bench.

keeping pace with industrial and commercial work. Chapters in Indiana, Florida, Missouri, and Texas volunteered the information that removal of rent controls on new construction by the Housing and Rent Act has apparently accelerated apartment house construction. Probably other areas would respond similarly if queried on increases in residential construction noted since July 1. The survey, however, was confined to non-residential contract awards."

Of the 40 chapters in 33 states and the District of Columbia that participated in the survey, 18 chapters report an increase in the volume of non-residential construction, ranging from "slight" to "substantial."

## N. J. Spent $30 Million on Roads Since War's End

In the two years since the end of the war New Jersey has awarded 62 road and bridge contracts for modernization of State routes, according to Spencer Miller, Jr., State Highway Commissioner.

To meet traffic requirements the bridges and roads now have multi-lane paving similar to the four roadways on Route 25 (U. S. 1) between Newark and Elizabeth. The bridges total about 4500 feet in length and the roads 41 miles on the straight-away.

On most of these improvements the State and the Federal Government, through the U. S. Public Roads Administration, share equally in the cost. The road contracts following VJ Day represent an investment of $13,583,039 and the bridges, $9,758,498. The right-of-way authorized for purchase totalled $6,654,000.

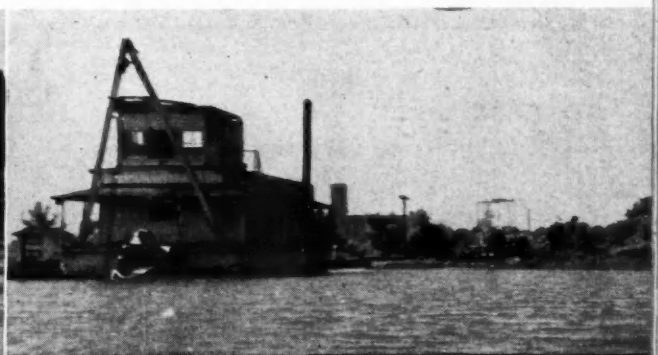
Increased traffic volume has required new facilities in virtually every part of the State and extensive operations were advanced especially in the northern and southern metropolitan areas. To meet demands for traffic relief in all parts of the State, the department has on its schedule more than 55 projects authorized for the present fiscal year.

For the period July 1, 1947 to June 30, 1948, the Legislature has appropriated $34,421,000 for construction on State roads. But even this sum, it is asserted, falls far short of meeting all requests for the highway department to take over additional road mileage.

A long range schedule featured by parkways and freeways, it is explained, will be the only adequate solution in New Jersey for efficient overland transportation with safety. In accordance with this design continued progress on the parkways and freeways is listed for the current fiscal year. The department, however, is working against time to open the new arteries for travel.

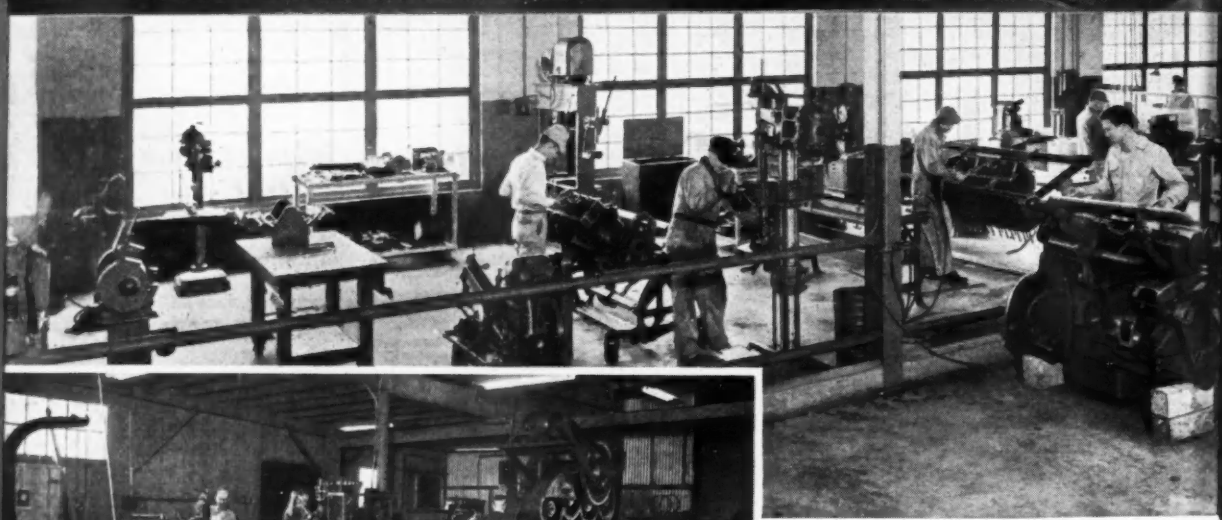
## Progress of NY's Thruway

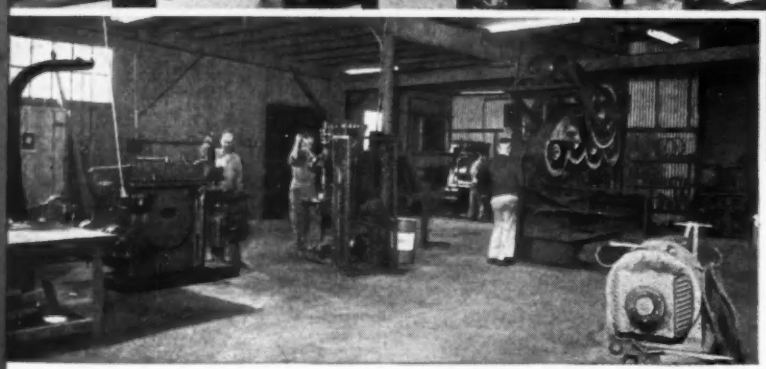
Winter and a late spring slowed the 1946 autumn-let contracts on New York State's $200 million, 486-mile Thruway near Syracuse, two in Greene County



• When torrential rains brought the water level of Carter Lake three feet above normal and threatened the subgrade on the adjacent municipal airport runways, authorities of Omaha, Nebraska, and Carter Lake, Iowa, decided after a joint meeting to kill two birds with one stone. The city of Omaha 5-in., 8000 g.p.m. dredge (above right) was put on 24-hour duty discharging through a 12-in. line into a storm sewer. Present pumping is lowering the 7½-mile-long lake one inch a day. The dredge will then be used to deepen shallow areas and fill swampy land. In the meantime, the U. S. Public Health Service is cooperating by plane-spraying (above left) the entire area with DDT solutions to keep down the mosquito population. A near fatality occurred just after this photo was taken when an inebriated fisherman fractured the low-flying ship's propeller with a well aimed beverage bottle. The pilot was able to glide to a bordering airport.

International distributors maintain complete stocks of parts under a perpetual inventory control. This, plus nearby International parts depots, assures prompt supply of any needed part.





Factory-trained mechanics, using modern fixtures and tools, make sure of factory-level servicing, repairing and rebuilding of International engines. The engine department of a distributor's shop is shown above.

Shears, drills, lathes, punch presses and other powered tools are used in many distributors' shops for equipment repair or construction.

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WHEEL TRACTORS

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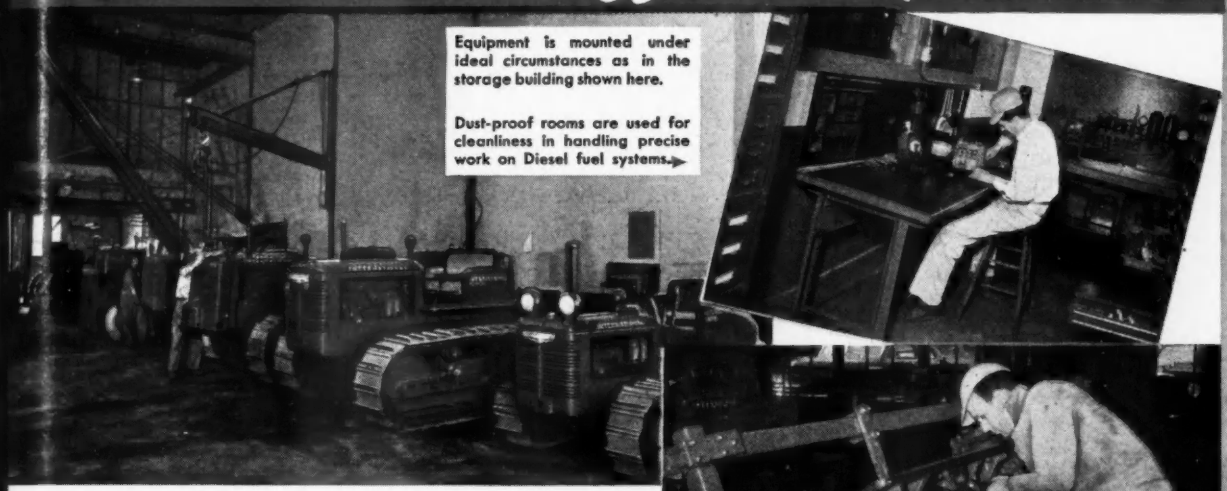
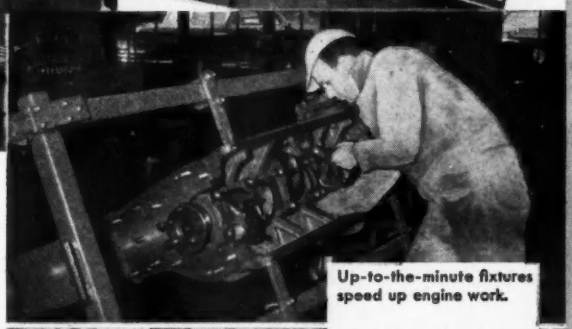


Equipment is mounted under ideal circumstances as in the storage building shown here.

Dust-proof rooms are used for cleanliness in handling precise work on Diesel fuel systems.



Up-to-the-minute fixtures speed up engine work.

Wash racks near receiving docks promote cleanliness.

INTERNATIONAL Industrial Power Distributors throughout the nation are superbly equipped to service and maintain International tractors and International-powered equipment.

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# *Industrial Power*

and one each in Ulster and Monroe-Ulster Counties. However since May 1st, new bids have been received and contracts let almost weekly.

One of the more advanced jobs is the 4-mile $1,958,856 contract of S. J. Groves and Sons between Fishers and Pittsford. They have well along the culverts, grading and relocation of a 1½-mile section of U. S. 96, the cloverleaf intersection to the same and are generally showing good progress. U. S. 96 becomes the lead-in route to Rochester, under the Truway's plan of passing not through but near all possible cities between New York City, Albany, and Buffalo.

The contract for an adjoining road section was let recently to Mauger-Smith, Inc. and the A. L. Dougherty Co. of Columbus, Ohio for $773,966. The contract includes no pavement, but all needful excavation and grading (some cuts and fills run as deep as 40-feet), drainage, structures and facilities, a bridge spanning Irondequoit Creek, and a grade separation at the Van Voorhis Road. The grading is for two arteries, each eventually to be concrete-paved as two lanes, with provision for a third 12-foot lane and a 20-foot central mall.

The Thruway is the State's major project in its $840,000,000 5-year public works construction program. The route is to be toll free, have no traffic lights, grade crossings but will have turnout lanes for disabled cars. It is to have two 3-lane opposite arteries with a shrubbed separator-mall, 1000-feet visibility, half-mile radii minimum curves, and not over 3% grades.

## Place Bertrand Levee Contract

A $161,263 contract for approximately 660,000 cubic yards of semi-compacted earthwork has been awarded to Ferry Bros. and L. E. Harris, contractors of Jackson, Mississippi. The project is the Bertrand Levee of the Red River levees, and is located about 3 miles downstream from Boyce, in Rapides parish. It is expected 185 calendar days will be required to complete this project.

• Excavating and hauling equipment is a part of the academic picture at present on the University of Illinois campus at Urbana, Illinois. Above, a Lima ¾-yd. dragline with 35-ft. boom digs trenches for water, gas and sewage lines. Below, loading to a Ford 2½-ton dump truck is a Buckeye dragline swinging a ¾-yd. bucket on a 35-ft. boom in excavation for a new University building. Working around the dragline is an International TD-14 tractor with Bucyrus-Erie bulldozer and the truck in background is a 2½-ton Diamond T.

## Construction Lack Pushes Up Maintenance Costs, ARBA Finds

A recent report to the American Road Builders' Association from state highway departments shows that lack of highway construction has resulted in increased maintenance costs in 32 states and that maintenance expenditures will continue to rise if the highway construction program lags.

"Unless a constant program of new improvement is carried on, maintenance costs rise to exorbitant proportions, the amount of excess depending on age and obsolescence of the roads," according to H. K. Bishop, reporting for the A.R.B.A. "Thus maintenance dollars can become extravagant instead of being the high-powered construction dollars which benefit our entire national economy and give the motorist the roads he wants and needs.

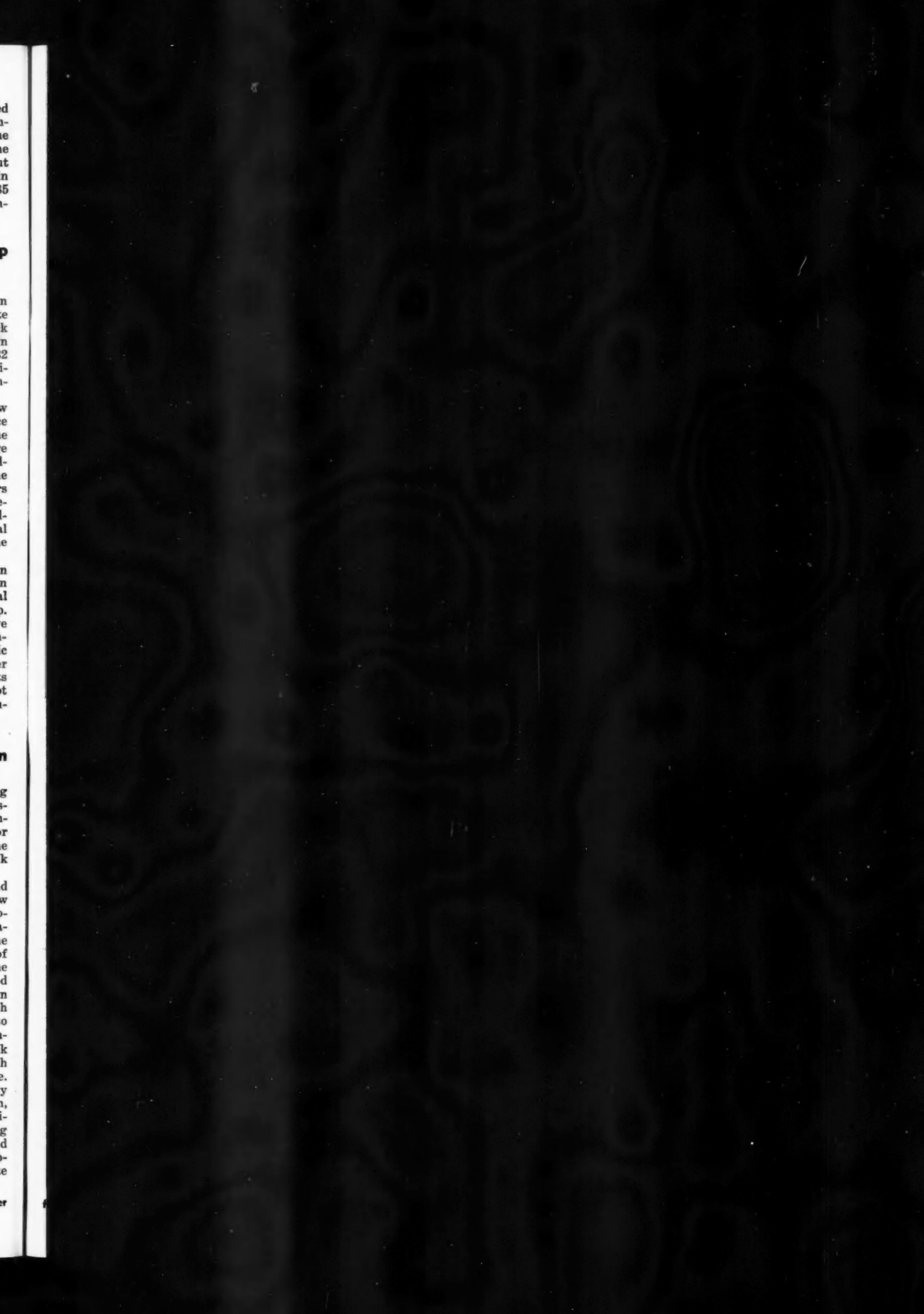
"Only a small beginning has been made on the vast highway construction program authorized by the Federal Highway Act of 1944," said Mr. Bishop. "It is predicted that we will have 40,000,000 motor vehicles on our highways by 1950. Unless this gigantic program of construction gets under way, traffic congestion and accidents will increase. Patched up roads cannot meet the requirements of rapidly increasing traffic."

## Unearth Prehistoric Relics in New England Excavation

New England scientists are studying evidence of prehistoric Back Bay (Boston) life unearthed by the Turner Construction Company in excavating for the new skyscraper addition to the home office building of the John Hancock Mutual Life Insurance Company.

Fragments of fish weirs were found which, according to the scientists, show that in 1700 B. C. the ancestor of Samoset, Indian friend of the Pilgrim fathers, was snaring the ancestors of the State House codfish in the waters of Back Bay. The fish weirs, made by the early Indians of stakes and brushwood sunk into the mud with twigs woven between them, formed a primitive fish net. When the modern shovels bit into the earth at Berkeley Street they unearthed pieces of these stakes still stuck into the ground and long covered with silt and sand deposited at a later date.

Now almost petrified into rock by their ages of underground preservation, the stakes still tell the story of primitive Americans ingeniously sharpening wooden sticks with stone axes and fashioning them into weirs for the trapping of fish. Archeologists estimate



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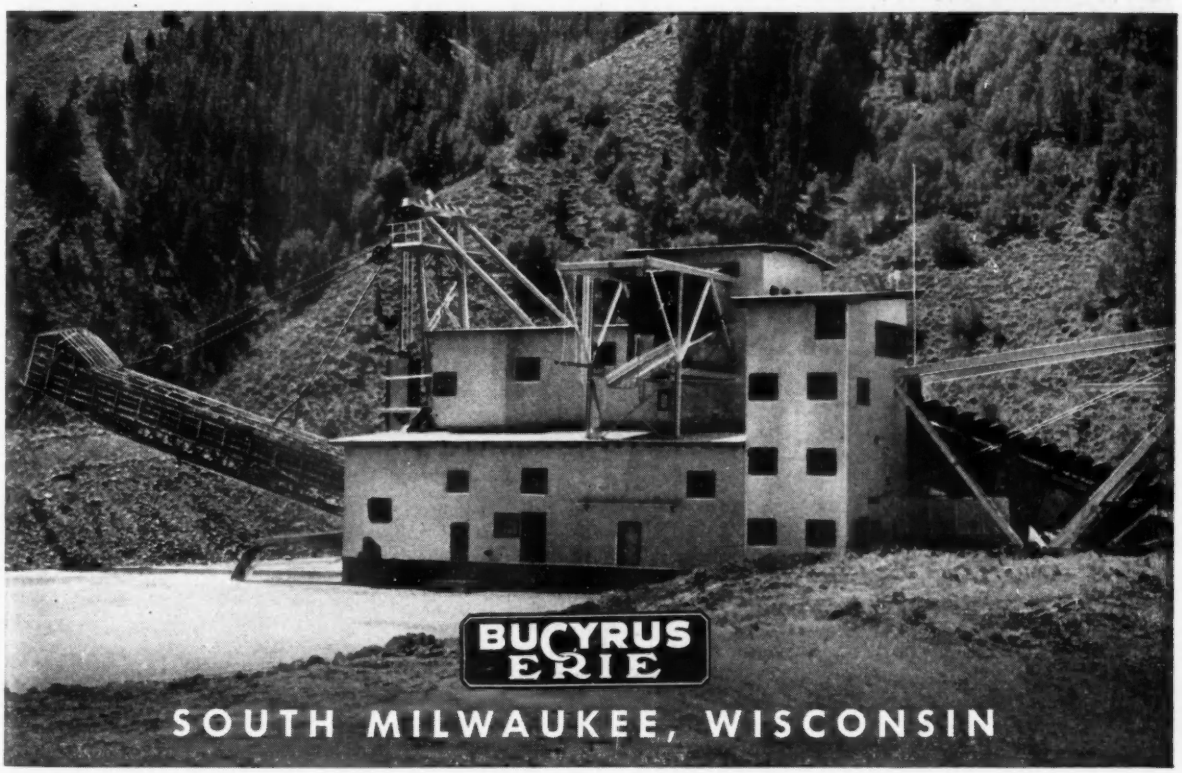

• Contractor Stewart S. Sill, Sodus Point, N. Y., uses his Autocar tractor and heavy trailer plus special blocking to haul a double load—his two International TD-14 tractors with Bucyrus-Erie Bullgraders—from job to job.

that such fishing went on for several hundred years until the silt being deposited by the ocean waters destroyed the fishing and the Indian ancestors had to move on to other spots.

Although as recently as 100 years ago Back Bay was an expanse of marsh and water, it has not always been so. Long before the John Hancock Building site was an Indian fishing spot, a forest of large trees grew upon the area. This was when the land was raised above sea level for a considerable period of time. The trees were rooted in soil developed in blue clay. Fresh water backed up over the area for a short time and peat was deposited, covering the stumps of the trees before the salt water came in.

The blue clay goes back a matter of 10 to 15 thousand years when the glacier came within a few hundred miles of Boston. As it moved with measured geological tread, it scraped up the clay which was then carried by the rivers to the ocean and deposited on bed rock beneath the sea.

The Turner Construction Company made test borings 155 feet below the surface of the ground to find bed rock. As they bored through these various layers of silt, peat and blue clay, they provided an unusual opportunity for archeologists to trace the history of the geologic ages that have passed over the Back Bay area. Microscopic shells and plant life skeletons, and pollen extracted from the blue clay and silt all help to fill out the story of prehistoric life in this region.

A group of scientists, led by Frederick Johnson of the Robert S. Peabody Foundation for Archeology at Phillips Academy, Andover, and including men from Harvard University, Massachusetts State College, Amherst College and the Smithsonian Institute are now studying the material taken from the excavation.

The silt and clay made it necessary to drive 10,000 tons of steel pilings to support the 26-story building, which will contain 14,000 tons of steel framing. But the long and costly pile-driving job which taxed the ingenuity of the Raymond Concrete Pile Company, Turner subcontractors, will be counter balanced to some extent by the valuable scientific information brought to light about the world in ages past.

## Prepare to Accelerate Missouri Basin Work

The Bureau of Reclamation's engineering and regional offices were instructed last month to make ready for an accelerated Reclamation work program in the Missouri River Basin in the event funds become available under the President's flood control program. The new budget item of $10,000,000 submitted to the Congress by the President calls for starting construction this fiscal year on 12 new projects and for speeding work already under way on three projects.

In a statement, Commissioner of Reclamation Michael W. Straus said, "These 15 dams comprise the first stage step up of the 46-dam Reclamation program already authorized by the Congress. Moving them into construction would speed flood relief for the Missouri River Basin. I have requested Bureau engineering and construction offices to take all possible steps now to get work on the 15 dams under way at the earliest date when funds may become available. This involves hastening work on plans and specifications the design of structures, preconstruction work at the sites and other steps that must be taken before actual construction can start. Early surveys have been completed heretofore and Congressional authorizations have been granted.

"Since the 1947 construction season is now half gone, we must move forward with dispatch because of the urgency of the situation. This advance action must be without jeopardizing the progress on other work being carried on under our normal construction schedules."

Of the 31 dams remaining in the next stage, work is already under way on two. These are the Kortes Dam in Wyoming and the Angostura Dam in South Dakota, both started in 1946. The remaining 29 dams under the second stage are all new structures on which construction has not yet begun.

The first 15 dams for which the President requested funds would provide 7,638,000 acre-feet of storage capacity, or 57 per cent of the total of 13,000,000 acre-feet to be provided by all 46 dams in the accelerated program. Ten of these first 15 are in the Republican and Kansas River Valleys where disastrous floods struck in June. The other five will provide river control and water conservation on the Yellowstone, a principal flood contributor, the Powder, Bighorn, Heart and Missouri River proper.

• Map shows dams included in the $10 million proposed accelerated reclamation program designed to speed flood control in the Missouri River Basin.

## Construction Machinery Prices Rise 12% in Year

Continuing the upward movement begun after the end of the war, prices of construction machinery rose approximately another 3 per cent in the three-month period April-June, 1947, according to the Bureau of Labor Statistics. During the first half of this year, prices for these types of machinery have increased nearly 6 per cent. Construction machinery prices in June were 12 per cent higher than in June

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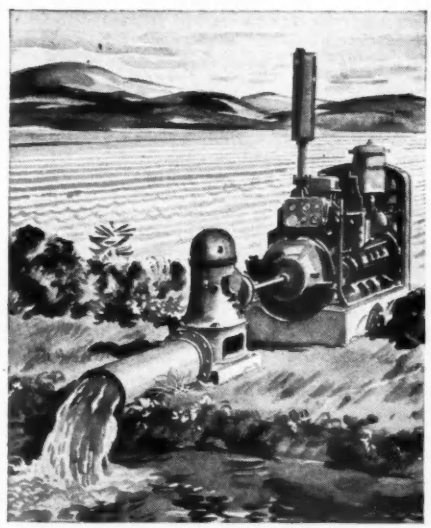
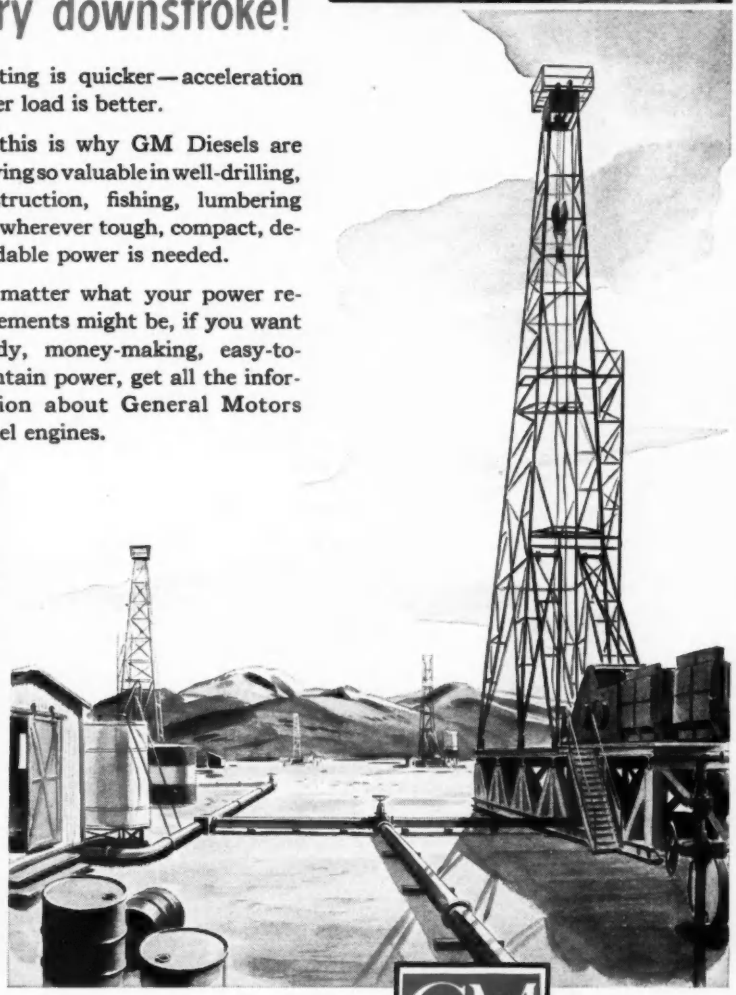
No matter what your power requirements might be, if you want sturdy, money-making, easy-to-maintain power, get all the information about General Motors Diesel engines.





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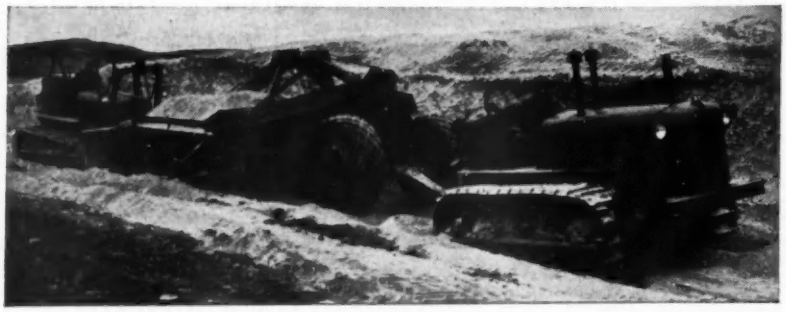


• F. A. Sheridan Construction Co., Billings, Montana, plans to strip-mine sulphur up to 1000-ft. deep with this Allis-Chalmers HD-14 tractor pulling a Gar Wood 15-yd. scraper and the A-C HD-10 tractor with Le Tourneau bulldozer. The sulphur vein lies three miles west of Cody, Wyoming, in what was once the largest geyser basin in North America — featuring geysers which far surpassed Yellowstone's famous "Old Faithful." The surface is now covered with a 4 to 6-ft. layer of solid rock (geyserite), underlain for 15 to 20 feet by mixed sulphur and gypsum. The vein of 80% pure sulphur below varies from 500 to 1000 feet in depth. Both the gypsum and sulphur will be shipped out to be used commercially.

1946 and almost 37 per cent above August 1939.

Prices increased each month during the period from April through June 1947, advancing 0.3 per cent in April, 1.4 per cent in May and 1 per cent in June. During the quarter, prices for scrapers, maintainers and graders and for track type tractors rose approximately 5 per cent. Smaller increases ranged from 2.8 per cent for material processing equipment to less than 1 per cent for mixers, pavers, spreaders and related equipment.

## Set $12 Million as Maximum Montana Road Program

Available federal funds for highway construction are being fully utilized by Montana, a statewide highway committee was told by State Highway Engineer Howard W. Holmes.

In addressing a meeting at Helena of the State Highway Commission with the committee, Holmes said Montana's current road building program is based on $7,100,000 of available federal funds, of which $2,800,000 was appropriated by previous Congresses and the remaining $4,300,000 was under consideration as a budget request. He said the federal money would support a $12,000,000 Montana highway construction program annually, the maximum practical in the state.

Headed by Fred J. Martin of Livingston, the committee had requested detailed data on the status of road projects, to clear up asserted confusion in the mind of the public concerning the program. Besides seeking more information on highway commission policy and procedure, the committee recommended additional gasoline taxes and investigation of gasoline tax refunds which, the committee said, have increased from 7 to 23 per cent in recent years.

## $4 Million N.D. Awards

A recent announcement from North Dakota Highway Commissioner N. O. Jones indicates that his department has awarded more than $4,300,000 in construction and maintenance contracts thus far this year.

## Krug States Proposed Plan Would Bring Flood Control Benefits in Three Years

The proposed speeding of Reclamation construction in the Missouri River Basin under the President's comprehensive flood control program would begin yielding flood control benefits in 1949 and bring about realization of irrigation, hydro-power and other benefits much earlier than anticipated under the present rate of progress, according to Secretary of the Interior J. A. Krug.

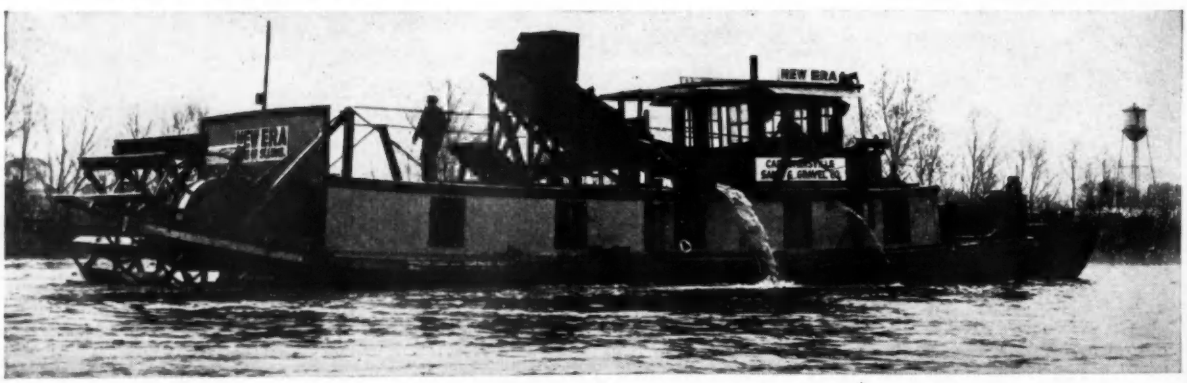
The President's program would make possible speeding construction of dams already approved by the Congress to be built by the Bureau of Reclamation in the Missouri Basin. Designed primarily to conserve irrigation water under the Congressionally approved Missouri River (Pick-Sloan) Plan, Reclamation dams embrace important flood control aspects, and some, in addition, have hydro-power and other benefits.

There are 46 Reclamation dams which could go forward under an accelerated construction program. These are comparatively small structures which could be built in two to six years, were funds available. Work is already under way at four of these dams.

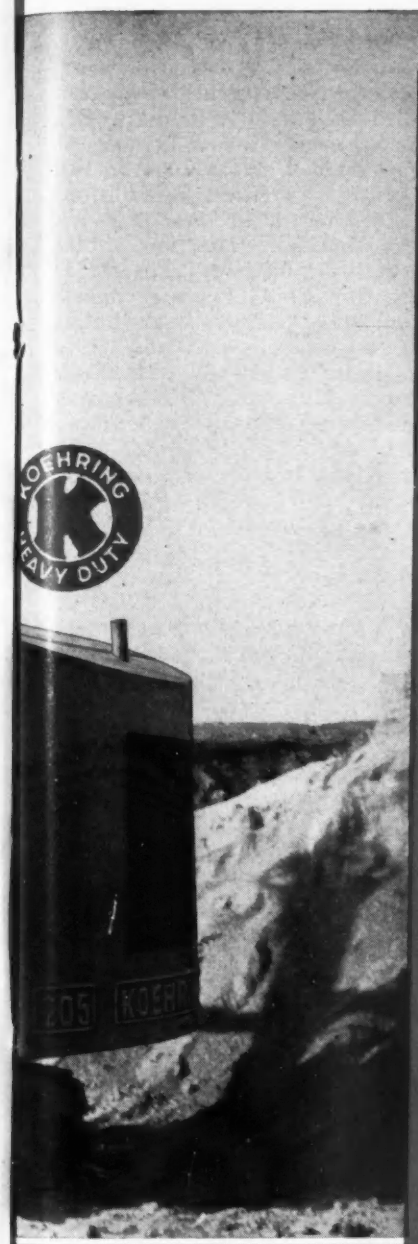
The reservoirs formed by the 46 dams would have a combined capacity of more than 13,000,000 acre-feet, representing about 42 percent of the 31,000,000 acre-feet average annual flow of the Missouri at Kansas City. They would be located on Missouri River tributaries, and catch the runoff from a drainage area of about 125,000 square miles—almost as large as New York, Pennsylvania, and Ohio combined.

The President's comprehensive program calls for dealing with Missouri River Basin floods under the Missouri River Plan, approved by the Congress in 1944. The plan provides for the Bureau of Reclamation to carry out water conservation and use, through irrigation, hydro-electric power, flood control, and other resource development, on the river system's tributaries, and for the Army Corps of Engineers to build main stem works designed primarily for downstream flood control and navigation benefits. Army dams also would generate hydro-power to be

*(Continued on page 564)*




• Operating within a 5-mile radius of Caruthersville, Missouri, is this 113-h.p. G.M.-diesel-powered combination tow boat and sand pumper. By shifting the drive belt, the Caruthersville Sand and Gravel Company's 60-ft. "New Era" can be changed from propulsion to sucking with the 6-inch sand pump. Sand is screened, deposited in a barge towed astern, and brought to the Company's yard located on the Mississippi river bank.



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Smooth working surface and most efficient weight distribution for balance and greater digging efficiency. Stronger and longer-lived because of solid, heavy plate construction.

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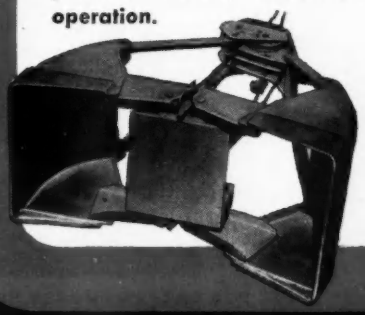
Wide, low-sided clams, with wide, solid lower arm brackets, get capacity loads and reduce spillage. Protector plate below lower sheaves keeps sheaves clean, prolongs life. Hard cutting manganese lip edge actually gets tougher with use.

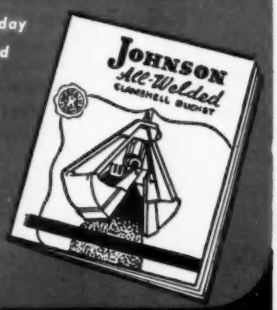
## FASTER OPERATION

Larger diameter sheaves, with fully sealed needle roller bearings, reduce power loss by friction, deliver full power to cutting edge, combine to provide faster, smoother operation.



¾ to 2½ yard sizes. General Purpose, Wide Rehandling and Heavy-duty Digging Type.

*Write today illustrated catalog.*




THE C. S. JOHNSON COMPANY

KOEHRING SUBSIDIARY CHAMPAIGN, ILLINOIS

## *Mills Field*

*(Continued from page 537)*

matic roller is used to compact the fill to 95 per cent density. The fill is about 15 feet thick, sufficient to crust the underlying mud and hold the heavy aircraft of the future.

The Atkinson company began work on its contract on April 16, 1947. The termination date specified in the agreement is March, 1948. However, the contractors expect to finish before the California winter rains begin, some time near the end of November. To accomplish this they moved a million yards in the first eight weeks despite moving-in operations, and look forward to achieving a million yards a month. The average in July was about 2500 bank yards every hour out of the pit. The trucks work two eight-hour shifts, five days a week. To maintain the pace, however, repair operations must go on 'round the clock.

Speed (which means economy) and safety are the two Atkinson goals on this job, as they are any competent company's objectives. Numerous special measures have been instituted to meet these ends.

Constant patrolling by water trucks and continuous operation of graders on the haul road have kept the road in good condition.

Safety prompted the installation of screens on the overhead bridges which cross the two main highways. These deflect the clods of hardpacked, rock-like earth which fall off the high speed trucks on their way to the fill.

Additional speed has been the result of the removal of several bottlenecks in the haul road. Now it is physically possible for four trucks to pass abreast at any point in the road, ramps and overheads excepted.

Summing up, the Atkinson Company believes that the two keys to successful operation on the job of this character are the highest speed haul compatible with safety, thanks to constant road maintenance, and the efficient use of shovels by benching the borrow pit.

The Atkinson Company has had extensive experience with large scale work of this sort. They were the contractors on the two biggest rolled-fill dam jobs in the world, the Hansen Dam near Los Angeles, and the Denison Dam on the Red River in Texas. In addition, they constructed Washington's Mud Mountain Dam, one of the largest rock fill dams in the world. The Guy F. Atkinson Company were active partners in the building of Grand Coulee Dam.

Besides Robert W. Atkinson, Project Manager, the job boasts the services of many old timers, such as "Slim" Conley, Field Superintendent for daytime operations, and "Mik" Daley, in charge of the fill. Joe Canto is Chief of Swing Shift Operations; Bruce Wheeler is Master Mechanic, aided by Frank Ryan; O. T. Dellinger is Chief Warehouseman; Brad Jarmin is Office Manager, Pearl Johnson is Chief Timekeeper, and Bill Wolff is Office Engineer. For the City of San Francisco, A. J. Wehner is Resident Construction Engineer, assisted by J. H. Best and C. A. Dailey.


ARE YOU LOOKING FOR A DIGGER?

In Blaw-Knox two-line lever arm type you'll find both round and square nose dredging buckets with capacities from 1½ to 7 cu. yds. All of them are built for underwater work—tough, long wearing and dependable. For complete data *write for Catalog No. 2076.* You can select *exactly* the bucket you need from pictures and data in this book.

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P&H's heavy duty, mill type shovel motors are *built* for the quick reversals demanded in digging. They are mounted in husky rolled steel frames; all-welded. Ball bearings throughout are carried in extra large bearing capsules to assure perfect alignment. Armatures are Dynetrically balanced—banded and braced for safe operation at over double their rated speeds.

Generator response is instantaneous—without the usual damaging current and voltage surges. Master controllers function on a new principle by which make-and-break contacts in the control circuits are entirely eliminated. Rotating regulators, contactors, and resistor banks are also eliminated. Wiring throughout is reduced more than 40%.

Perfection comes in a lot of little things . . . things P&H has learned through more than 60 years of leadership in applying electrical power to the movement of heavy loads.

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**HARNISCHFEGER CORPORATION**

**LEADING THE WAY IN ELECTRICAL SHOVEL DEVELOPMENTS**

## Shots

*(Continued from page 558)*

distributed through the Department of the Interior's marketing facilities.

As flood control devices, the Reclamation dams are designed both to give protection to communities on the tributaries, and to cooperate with the Army dams by holding back tributary runoff in times of high water down river.

## Announce Change in Georgia Road Awards Procedure

Georgia plans to let from $2,000,000 to $2,500,000 in road contracts each month for the next year, according to an announcement by State Highway Director John Beasley. He explained the plans were part of a $32,000,000 federal-aid construction program set up last year for a period of three years, with the federal government matching state funds on a 50-50 basis.

Making his announcement to more than 100 representatives of road contractors, he declared: "We appreciate the cooperation of the highway contractors in trying to make a success of what we are doing. But we have decided against two things which we consider to be unfair to other contractors.

"We have decided that it is bad practice to allow contractors to raise or lower their bids after they have been read out. We also have decided that it is unfair to let a contract to a bidder who does not have the equipment to carry out his contract in the specified time. So we are making bids conditional to some extent.

"Beginning in August, we will let contracts for bridge construction and grading separately, because some contractors are not equipped to do both jobs expeditiously."

## Seek Increased Federal Loan for Brooklyn-Battery Tunnel

The Triborough Bridge and Tunnel Authority has revealed that work on the Brooklyn-Battery Tunnel has been confined for six months to completion of present contracts pending the outcome of negotiations to increase a federal loan for the project from the present $57,000,000 to $71,000,000.

In a financial statement covering the period from Jan. 1 through June 30, the authority reported that early this year current contracts for the twin tubes of the vehicular tunnel had all but exhausted the original $57,000,000 loan granted by the Reconstruction Finance Corp. in 1940. Because of postwar increases in construction costs, the authority now estimates that another $14,000,000 is needed to furnish the traffic link between South Ferry and Brooklyn.

It was understood that negotiations between the authority and the RFC to increase the amount of the tunnel loan also included proposals for refinancing the Queens Midtown Tunnel, often referred to as the "sick chicken" of the Authority's ventures in bridges, tunnels and parking lots. The Midtown Tunnel ended the first half of this year with a $62,886 deficit, but its sister projects all showed healthy net profits.

Indications were that the delay in negotiating an increased loan for the Brooklyn-Battery tunnel project will not upset Authority hopes to open the tunnel to vehicular traffic in the spring of 1949. On July 19 one of the twin tubes of the project was joined by a 10-foot "rat hole" drilled by sand hogs working from the Brooklyn and Manhattan sides. Work started in October, 1940, but was slowed during the war because of material and labor shortages.

## New Bond Issue to Provide More South Carolina Funds

South Carolina's State Highway Commission has approved a $5,000,000 bond issue, with another $3,000,000 to be asked later on if needed, to finance highway construction throughout the state. The governor and state treasury were requested to issue the sum in state highway certificates of indebtedness during August.

O. P. Bourke, secretary-treasurer of the commission, said that $8,000,000 would be needed to maintain a $3,700,000 balance now on hand and which is needed to finance work during the current fiscal year.

## Insurance Figures Discount Safety of Super Highways

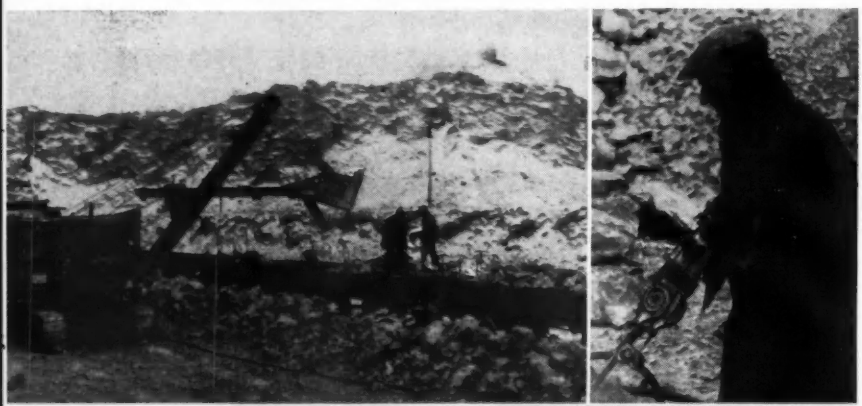
**(Reprinted from Highway Research Abstracts)**

The eminent highway authorities of this country have in recent years condemned the character of our existing highway system. They have pointed to its severe grades, defective alignment and limited sight distance as serious traffic hazards and often they recite the appalling toll in life and property which is destroyed on our highway systems annually. They maintain that our designs should be modernized. In addition to new pavements, they should have traffic safety built into them to avoid or reduce the enormous accident volume.

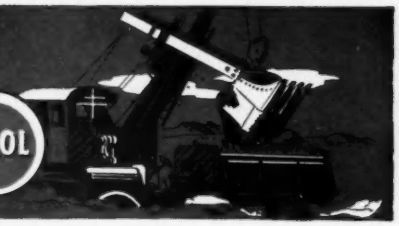
Most of us are inclined to agree with them. The National Safety Council has reported in Chicago that 2,410 persons were killed in traffic accidents in this country during March, bringing the total for the first three months of the year to 6,920. The March deaths were, however, 14 per cent below those of March 1946, and the three months total was 16 percent below that for the same period of 1946. No effort was made to account for the decrease. Perhaps there is no explanation.

Now, the Travelers Insurance Company in its annual compilation of traffic accidents facts provides some information that might seem to contradict our highway experts. According to this source, 78 per cent of the fatal traffic accidents last year occurred on dry pavements. Eighty-five per cent of them occurred in clear weather. Eighty-two per cent of all accidents involved

**• The Czechoslovakian cement industries are now operating at full capacity, according to a recent dispatch. In one of the many quarries located near Beroun, Czechoslovakia, a Skoda 2-yd. shovel is shown loading limestone to railroad cars. Other photos show workers breaking up limestone in the quarry with an air drill, tending a kiln conveyor, and removing for shipment filled bags of cement.**



# STANDARD ENGINEERS NOTEBOOK

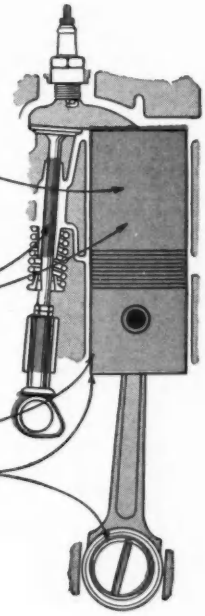


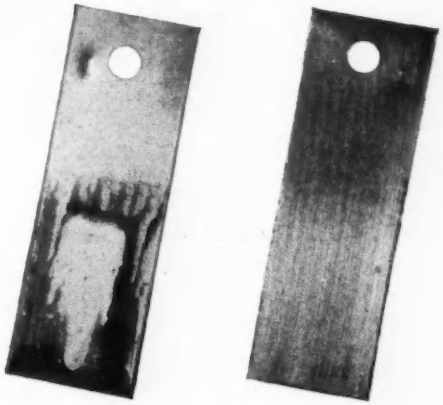

① Adhering agent in RPM Compounded Motor Oil keeps oil film on all parts after engine stops, even on cylinder walls.

② Rustproofing compounds prevent moisture that condenses on cooling parts from contacting metal.

③ No rust is formed to scrape off when engine starts, and cause excessive wear.

④ Constant lubricant film provides adequate and instant lubrication when engine starts.





This actual photograph shows how one HIGH-QUALITY MOTOR OIL "peeled" off almost all of this test strip of steel when it was placed in corrosive-moisture conditions similar to those in a cooling engine. The oil concentrated at one spot and the unprotected surface quickly rusted.

RPM COMPOUNDED MOTOR OIL kept this strip bright and shiny, completely sealed against rusting, when it was exposed to the same conditions. "RPM" compounds keep a constant rust-proofing lubricant film on engine parts at all times, whether they are idle or moving.

## How RPM Motor Oil Rust-Proofs As It Lubricates

Rusting, caused by corrosive moisture, is the greatest source of wear in automotive engines (85%, according to some engineers). It can be controlled by using RPM Compounded Motor Oil.

Additional compounding for "RPM," perfected by Standard of California scientists, provides a rust-proofing lubricant film on internal engine surfaces. The heaviest moisture condensation in idle or cold-running engines will not cut through it.

Other compounds in RPM Motor Oil give it adherent qualities so the film stays on parts at all times. They also loosen and remove gum and lacquer, lubricate hot spots, resist sludge formation, bearing corrosion and stop foaming.

Trademark "RPM" Reg. U. S. Pat. Off.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Colo.; Standard Oil Company of Texas, El Paso, Texas.

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cars moving straight ahead. Ninety-two percent of them involved cars in apparently good mechanical condition.

Presumably, the small remaining percentages of such accidents happened in some other manner.

Among the causes given and at the top of the list is excessive speed which accounts for nearly half of the accidents. Driving on the wrong side of the road also takes a heavy toll. Reckless driving is the third biggest factor, and these three account for 74.4 per cent of all traffic accidents.

These statements point at one inescapable conclusion, that the driver is the real cause of the greatest number of accidents.

## Tests Prove Expressway Saves Gasoline

Positive evidence that the 50,000 motorists who daily travel the Arroyo Seco Parkway between Los Angeles and Pasadena save a half-gallon of gasoline in each 20 miles of driving by using the high-speed expressway in preference to existing surface streets has been demonstrated in an engineering study conducted by the Automobile Club of Southern California. The tests were carried out over driving runs—one on the Arroyo Seco Parkway and the other on a parallel route via surface streets.

Using an Akroflo meter, which accurately checks on gasoline consumption up to 5/100s of a gallon, the club's test car consumed 0.80 gal. of gasoline in traveling 16.59 mi. via the expressway as compared to 1.30 gal. of gasoline used in driving 17.90 mi. of surfaced streets. At this rate, the club study revealed, a 20-mile trip would consume 1.0 gal. of gasoline via expressway and 1.5 gal. of gasoline via travel on existing surface streets.

As a result of the study, the club estimated that motorists who use the Arroyo Seco Parkway save better than 10 cents per 20 mi. of travel.—Courtesy **Highway Research Abstracts.**

## Kentucky's 6-Month New Road Bill is $13 Million

A total of 151 contracts for improving 1,662.57 miles of Kentucky roads at a cost of $13,182,586.72 was awarded during the first half of this year, according to a recent announcement by the Kentucky State Highway Department.

Included in the improvements were $7,186,219.11 for surfacing and resurfacing 1,052.3 miles of state primary and secondary roads; $4,432,845.85 for reconstruction of 106.65 miles of state roads; $783,014.18 for bridges, sidewalks, flood-damage repairs, and other items; $685,956.63 for surfacing 476.66 miles of county rural roads and $94,550.95 for new construction under contract of such roads.

Fifty-five hundred miles of construction, reconstruction and surfacing of Kentucky highways cost the state a total of $58,972,433.71 during the past

• Part of the last UNRRA shipment to Czechoslovakia, Le Tourneau 4-yd. scrapers are unloaded in Prague's river harbor. The rigs will be used in the improvement and enlarging of Prague's airport, Ruzyne. Authenticated News photo.


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• Wellman pioneered **welded rolled steel construction** for longer life and greater service. It's the extra strength that gives the extra, low-cost digging power. Whatever your requirements . . . whether for Multiple Rope, Power Arm, Dragline, Power Wheel or Special Service—specify Wellman!

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# "No major repairs!"

Outstanding production records are an old story to Bucyrus-Erie excavators, which have consistently piled up long hours of operation with low maintenance costs. Take this Bucyrus-Erie 30-B dragline, for instance. Here is part of a letter received from Mr. J. G. MacLachlan, manager of the Hudson Bay Railway, Manitoba, Canada:

"The machine has been in continual seasonal operation since September, 1926 . . . has excavated 100 miles of side and off-take ditches, largely in permanently frozen ground, and other excavations to a total of approximately 1,000,000 cubic yards. We have had to make no major repairs."

There is no magic formula for the long life of Bucyrus-Eries. Durable parts in an efficient basic design; easily-made, long-lasting adjustments; simple, effective lubrication — all these play an important part in keeping Bucyrus-Eries on the job year in, year out, with a minimum of "time out" for repairs and with consistently economical operation.

Your Bucyrus-Erie distributor can show you why today's Bucyrus-Erie ⅜ to 2½-cu. yd. excavators can be depended upon for long service and still be "easy on the upkeep." Let him give you more information.

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seven years, according to the audit of the records of the Kentucky Department of Highways by the accounting firm of Waldeman, Petot and Company, Louisville. During the period from 1940 to 1946, inclusive, 39 bridges were built which cost $2,315,373.02.

The state highway system had under maintenance at the close of business on March 31, 1946, a total of 10,260.268 miles of roads, 890.868 miles having been added during the seven year period covered by the audit. Maintenance costs, in spite of increases in mileage, materials, labor and equipment, only increased from $5,132,392.80 in 1940 to $6,566,582.25 in 1946.

Sixteen toll bridges were freed during the period, 12 of them during the last three years. While the audit reports three remaining state-owned toll structures within the state, one, the Livermore bridge, was made free during the year following date of the audit. On all projects, $10,080,000.00 worth of bonds were retired during the period leaving $579,000.00 to be paid at the close of business on March 31, 1946. These bonds were divided $231,000 to be paid on the Rockport bridge; $285,000 on the Milton-Madison bridge and $63,000.00 (since paid off) on the Livermore bridge.

Earth or dusty state roads with no bituminous surfacing totaled 3,535 miles in 1940. By 1946, these low-type roads had been reduced to 3,244.7 miles. Intermediate type roads with light treatments increased from 3,977 miles to 4,405 miles, while high-type highways increased from 1,857 miles in 1940 to 2,610 miles in 1946. The cross section indicates that the period developed 1,181 miles of roads to a more adequate surface condition.

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GATKE Swing Frictions were originated to meet well understood service requirements. Thru a quarter century they have been improved again and again by development and research to meet changing service requirements.

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## Gasoline Consumption in U. S. Reaches New Peak

Motor vehicles operated on highways in the United States in 1946 consumed 25,649,000,000 gallons of gasoline, as compared with a total of 24,192,000,000 gallons consumed in 1941, the previous peak year, according to figures compiled by the Public Roads Administration of the Federal Works Agency from reports of state authorities.

The 1946 total represented an increase of more than 50 per cent over 1943, when gasoline rationing and other travel restrictions caused motor fuel consumption to drop to a wartime low of 16,000,000,000 gallons.

California led all states in the amount of gasoline used for highway travel last year, with New York second, Pennsylvania third, and Texas fourth.

Total mileage estimated for all types of motor vehicles last year amounted to 340,655,000,000 miles, with rural travel accounting for 170,606,000,000 miles and urban travel, 170,049,000,000 miles.

Passenger vehicles, including taxis and buses, traveled 284,509,000,000 miles; trucks, 56,146,000,000 miles. Average motor fuel consumption per vehicle was 747 gallons.

The average passenger-car owner traveled 9,942 miles during the year, purchased 665 gallons of gasoline, and obtained nearly 15 miles to the gallon.

## Plan Rapid Placing of New Engineers Contracts

Plans to speed up the Corps of Engineers construction work on the Missouri River flood control and development program have been announced by Brig. Gen. Lewis A. Pick, Missouri River Division Engineer. "It is our expectation," said General Pick, "that a large number of new contracts for work on important river control projects can be advertised between now and December 1, 1947. It is planned to obligate all the funds authorized by the Congress, prior to July 1, 1948, which is the close of the Government's fiscal year."

General Pick said that each District Engineer would be prepared to award contracts by competitive bidding on projects within his district for which funds were provided by the appropriation bill recently signed by the President.

The bill provided approximately $60,000,000 for flood control projects of the authorized Pick-Sloan plan, and an additional $6,750,000 of Rivers and Harbors funds for work on the 9-foot Missouri River navigation channel up to Sioux City, Iowa.

"Owing to the fact this working season is well advanced, particular attention was given to the necessity of completion of plans and specifications at the earliest possible date with a view to letting contracts as rapidly as practicable. We intend to take full advantage of the remaining months before winter weather in order to get as much work started this calendar year as possible."

General Pick said that all possible speed, consistent with efficiency and sound engineering practice, would be exercised in getting additional contracts under way at such large projects as the Garrison Dam in North Dakota; the Fort Randall Dam in South Dakota; Harlan County Dam on the Republican River in Nebraska; Cherry Creek Dam near Denver; Kanopolis Dam on the Smoky Hill River in Kansas, and such important projects as the flood control works at the Kansas Citys, Omaha and Council Bluffs.

## Indiana Plans Intensive City Parking Survey

After conferring with mayors and civic representatives of the cities, Indiana's State Highway Commission approved plans for surveys of street parking needs in five cities to be financed with federal funds and announced that the program would be broadened to include other cities.

The Indiana cities which will be surveyed first are Anderson, Huntington, Decatur, Frankfort and Seymour. W. F. Milner, state traffic engineer, said the Federal Public Roads Administration will finance the surveys, but all funds for such purposes are channeled through the State Highway Department.

Cost of making improvements in the cities' parking systems as recommended in the surveys will be shared by the cities and the highway department, Milner said. The highway department will make parking improvements only on state highways within cities, while all other changes in off and on-street parking will be financed by the cities.

Herbert D. Hartman, a member of the commission, said that eventually a total of about 75 Indiana cities are expected to participate in the program. Cities must organize their own parking committees before making formal application for federal funds, he added.

## Vermont Contracts Total $5 Million Since War

A recently-released report by the Vermont State Highway Board, reveals that during the two years since war's end the department has placed under contract or commenced with its own forces 143 miles of road construction and 22 bridges representing an estimated cost of $5,068,528.90. Of this amount, the Federal Government will pay approximately $2,239,497.64 and the State $2,829,031.26.

*(Continued on page 570)*


ALL IN A DAY'S WORK

8 A.M.

• LOADING FROM STOCKPILE AT 8 A. M.

10 A.M.

• DITCHING 30 MILES AWAY AT 10 A. M.

The SCHIELD BANTAM travels on the highway at normal speeds. Drives right up to the job and starts to work without wasting time. Use it as a dipper, trench hoe or dragline. The BANTAM handles stockpile material at a rapid pace, digs ditches in varying widths up to 10′ deep, and works wherever larger heavy weight equipment is not profitable. Simple, centralized controls. Full-circle design. Perfectly balanced for easy handling. Interchangeable booms. Wide selection of attachments for fast operations. Complete unit weighs 4 tons. Mounts on any 1½ ton truck.

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SCHIELD BANTAM 1/3 YARD PORTABLE SHOVEL-TRENCH HOE-CLAM-DRAGLINE

Additional highway projects programmed for the future by the board now total an estimated $3,811,786.79 with the Federal Government's share to be approximately $1,903,268.36. This proposed work comprises 93 miles of construction including 11 bridges, and will be made ready for contracting as rapidly as possible, along with other projects for which preliminary surveys are under way.

Most new construction planned by the department aims at completing unpaved sections of the highway, the board indicated. Increasing traffic and a changed pattern of road use since the war, it was stated, has required revisions in the priorities formerly allotted to certain types of improvement. According to the board, as heavier vehicles come into more and more general use, a gravel surface no longer is safe or economical even for secondary routes.

In order to obtain a maximum of improvement despite high costs, the board explains that certain modifications have been adopted without any sacrifice of basic construction standards. Such features as extensive relocations and radical grade changes, involving the movement of extremely large quantities of earth and rock, are being avoided in the interests of more miles of improvement. Drainage structures, sub-base construction and pavement continue to receive the department's primary consideration so that all improvements are permanent additions to the highway system.

The increased revenue made available by legislature last winter for highway work is credited by the Highway Board with permitting the acceleration of Vermont's improvement program this year. The board does not consider that its request for additional funds was unreasonable, and points out that more money could be used advantageously and still not satisfy the growing needs of the travelling public.

In addition ,to federal aid and state projects, the highway department gives special construction assistance to towns in paving their state-aid highways. Last year approximately 75 miles of this work was done, and during 1947 the mileage will approach the same figure. There also are other state funds appropriated to towns for highways.

## Announce $21 Million Road Program for Massachusetts

A program calling for nearly 74 miles of new highway construction in Massachusetts at a cost of $21,286,000, half of which will be borne by the federal government, "will be well under way by the early part of 1948," according to announcement by State Public Works Commissioner William H. Buracker.

The commissioner said the type of highway provided in the new program "has unusual features based on traffic volume and turning movements." Divided highways will be built on main travelled thoroughfares, with at least two lanes in each direction, shoulders at least eight feet wide, and no left turns, he said.

## Outline Progress on Columbia Basin Project

Steady progress was made on most irrigation features of the Columbia Basin Project in July, a Bureau of Reclamation operations summary reveals.

Work on the Grand Coulee Dam Pumping Plant and the adjacent Feeder Canal, however, was suspended in mid-July because of appropriation limitations. These structures were under construction by Government forces.

At Coulee City, Contractors Bair-Crick of Spokane attained full speed in placing of earth and rock embankments for the 10,000-foot South Dam of the Equalizing Reservoir. Grouting operations in a deep channel in bedrock were completed, and excavation for the approach channel and outlet works deepened.

J. A. Terteling & Sons, Boise, Idaho, reached the full 90-foot depth on a portion of the Main Canal which they are blasting out of solid rock between the South Dam and the Bacon Tunnel. South of the tunnel, Terteling continued earth excavation for another section of the Main Canal, and started work on a highway bridge and a railroad bridge over the canal.

T. E. Connolly, Inc., of San Francisco, advanced their 13-by-19 foot pilot bores

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for the two-mile Bacon Tunnel 600 feet at the south end, and 200 feet at the north end, for total advances of 4,150 feet and 1,900 feet, respectively. At the north portal, the contractor began enlarging the tunnel to its full diameter of nearly 27 feet. He also started compacting backfill material for the foundation of the Bacon Siphon, which will carry the Main Canal 1,000 feet across a deep coulee and into the Bacon Tunnel.

At the Long Lake Dam site near Stratford, Wash., Terteling & Sons completed a drainage tunnel through the east abutment, and nearly finished grouting and placing of concrete for the cut-off wall. The tunnel, which will permit draining of the 5½-mile Long Lake Reservoir, is 600 feet long and 7½ feet in diameter.

On the first section of the West Canal, east of Soap Lake, Wash., Utah Construction Co. of San Francisco and Winston Brothers of Los Angeles virtually completed excavation and compacting of embankments, and started placing of concrete for canal linings and Dry Coulee Siphon No. 1.

The same contractors made rapid progress in excavating and compacting embankments for the initial section of the East Low Canal near Adrian, Wash.

Lytle, Amis, and Green, Mid-west contractors, completed a 1,472-foot section of the 3½-mile Potholes Dam, south of Moses Lake, Wash., and prepared to place a concrete lining in a 700-foot outlet tunnel holed through during the month. The 9-foot diameter tunnel will serve as a new channel for Crab Creek, thus protecting downstream water rights.

Near Pasco, Wash., Terteling & Sons finished construction of 23 miles of laterals and wasteways for the Pasco Unit of the Columbia Basin Project, and James Construction Co. of Seattle started installing steel discharge pipe between the Pasco Pumping Plant and headworks of the distribution system. At month's end, the pumping plant was 79 percent complete.

## Study Advisability of $2 Billion N. Y. Highway Plan

A study to determine how New York State can finance a $2,000,000,000 highway construction program during the next thirteen years is being conducted by State Public Works Superintendent Charles H. Sells.

When the war ended New York had a surplus of about $600,000,000 in its "postwar reserve" fund, part of which was allocated to highways and part to hospital construction, both of which fell far behind schedule during the war years.

The original estimate of necessary and desirable highway construction in New York involved expenditure of $800,000,000 over a five-year period, but there was a considerable delay in getting many of the projects under contract, due primarily to the reluctance of contractors to bid. Some claimed the margin of profit allowed


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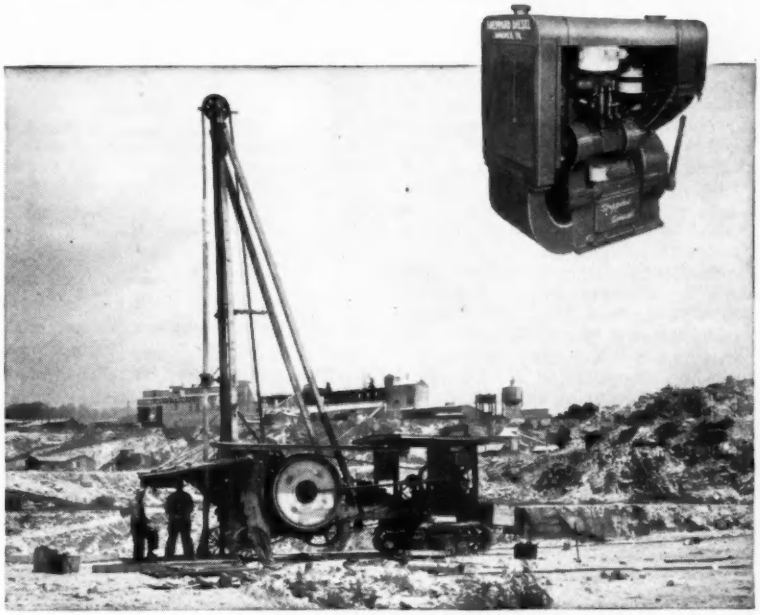

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was too small, while others shied away from bidding in the face of a state constitutional prohibition against employing workers on the projects for more than 40 hours a week or eight hours a day.

A solution of the latter problem was reached when the 1947 State Legislature enacted a law permitting the state industrial commissioner to declare an emergency in connection with highway work, thereby permitting a longer working day and week. Since then, the number of bids on highway projects has increased.

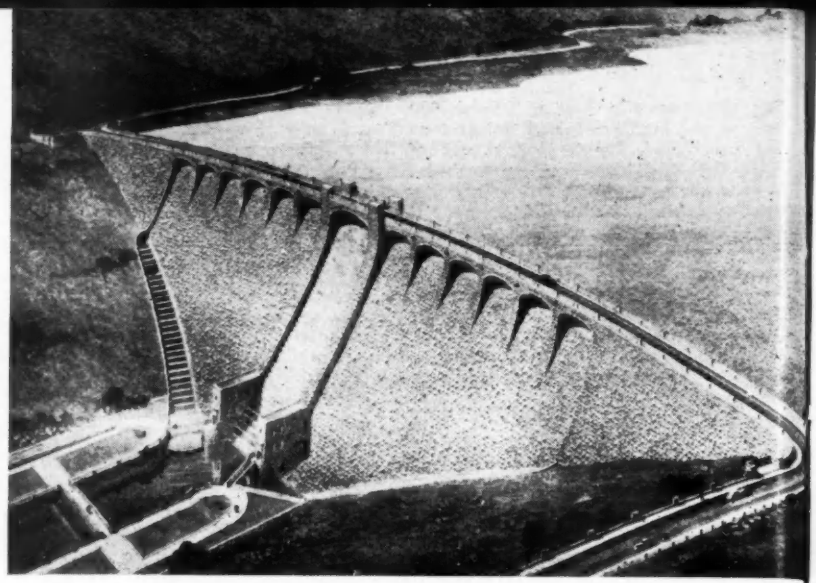
Main problem facing the state, however, is what to do when the state surplus is spent. State officials explain it is apparent that the surplus funds will not come close to meeting the actual cost of the work that must be done during the next 13 years.

While Superintendent Sells had not at this writing made an official estimate of the cost of the highway work required by 1960, the $2,000,000,000 figure had been mentioned. If such an amount is spent by 1960, the state will be forced to find at least $1,500,000,000 during the next 13 years, over and above funds in the postwar reserve.

It was revealed that despite the early reluctance of contractors to bid on state highway jobs, Sells has managed to place under contract, since V-J Day, approximately $75,000,000 or $80,000,000 in highway projects, of which $60,000,000 was let out by the end of 1946.

Contracts which have been let include seven covering portions of the $200,000,000 New York-to-Buffalo thruway. Two of these sections are being constructed in the Syracuse area, two in the Rochester area and three in the Catskill area.

It is estimated that completion of the thruway will require at least five years. Proposals to make the project self-liquidating by charging tolls were considered some time ago but subsequently dropped.



• Artist's impression of 182-ft. high by 1066-ft. long Claerwen Dam which will supplement the water supply of Birmingham, England, when completed in 1952. The construction contract has been awarded to Edmund Nuttal, Sons and Co., Ltd., London. Courtesy of THE ENGINEER.

## Authorize $7 Million Dam For South Wales, England

Edmund Nuttall, Sons and Co., London contractors, have been awarded a contract for construction of Claerwen dam on the River Elan, South Wales. The Ministry of Health authority extended to the City of Birmingham Water Committee for construction of the dam marks a departure from the original Elan plan.

The Elan supply scheme for Birmingham was authorized by Parliament in 1892 and existing dams and appurtenant works in the Elan valley, near Rhayader, in Wales, were completed and brought into operation in 1904. The original scheme provided for six dams, three on the River Elan and three on the River Claerwen, but only those on the Elan were constructed at that time, though foundations for one of the Claerwen dams were built.

Following the drought of 1937, the Water Committee considered the question of providing additional storage and was advised that it would be possible to provide by the construction of one dam a storage greatly in excess of that originally contemplated in the three reservoirs on the Claerwen River. The consent of Parliament was necessary to vary the original scheme by the construction of the one dam only, and was received in 1940.

The intervention of war made it impossible to proceed with the work, and the Department considered itself fortunate in getting though the difficulties of wartime without any restriction of supply becoming necessary. With the extensive housing development contemplated in the next few years it is not thought possible to delay the work any longer without running a serious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risk of having to impose restrictions should a dry summer be experienced.

The present storage capacity in the Elan valley is estimated to give a maximum assured yield of 72 million gallons per day, of which 27 million gallons per day are for compensation water to the river and 45 million gallons per day for supply purposes. In 1939 the average daily consumption was 37 million gallons per day. During the war the actual quantity of water sent into supply reached a figure of over 43 million gallons per day. A prolonged period of drought might have had very serious consequences.

Since 1942 the consumption has, for various reasons, declined and is now a little over 40 million gallons per day, but the normal annual increase in peacetime averaged over one million gallons per day. Since the dam will take five years to complete, it is thought that there is little margin of safety left if the increase of consumption follows its former trend.

#### Development Work

The new scheme was not left wholly in abeyance during the war years. Though no work could be done on the dam itself, steady progress was made in developing the approach road to the site. Rock foundations have been tested by excavation and by the drilling of bore-holes, and these tests have confirmed the suitability of the site. The new dam will have a maximum height of 182 ft. to crest level above stream bed, approximately half as high again as the existing dams in the Elan valley. The length will be 1066 ft., nearly double the length of the Caban dam, the longest on the River Elan.

The water impounded will make a reservoir approximately 4 miles in length, with a capacity of 10,860 million gallons, as against the existing total storage of 11,175 million gallons. The increase in storage capacity over that originally planned for the Claerwen valley will be 4090 million gallons.

A roadway is to be carried across the dam, which will be curved in plan so as to present a more graceful appearance than a straight structure. The overflow is to be placed in the central portion of the dam and the roadway will be carried on twelve arches of 40-ft. clear span placed symmetrically about a central span of 60 feet. The crest level of the dam under the central arch will be 6 inches lower than that under the remaining arches.

Normal overflows of the river will pass under the central arch and will fall down the face of the dam over a series of steps between substantial buttresses. Only in times of heavier flood will the water flow under the remaining twelve arches. The whole of the flow will be guided by training walls at the foot of the dam into a stilling pool and thence into the original river course.

The body of the dam is to be of concrete and the downstream face, together with the arches of the viaduct and the upper portion of the upstream side will be of rugged rock-faced masonry. There will be a carriageway 12 ft. wide with a footpath on each side across the dam and over the central main spillway section there will be a raised dais, about 45 ft. long on each side of the roadway.

Provision is to be made for four discharge pipes for the release of the impounded water when required into the river downstream of the dam, whence it will flow via the Dol-y-Mynach tunnel into Careg Ddu reservoir, and thence through the Foel tower into the aqueduct to Birmingham. The control valves on the two lower discharge pipes at the Claerwen dam will be housed in two valve chambers at the foot of the dam and on each side of the central spillway, while those on the two upper pipes will be housed in chambers within the body of the dam.

In addition to the dam and the ancillary river training works, approximately 9½ miles of road and four miles of footpath have to be provided in substitution for the existing access up the Claerwen valley. The scheme is estimated to cost 1,700,000 British pounds. The engineers are Sir William Halcrow and Partners, M. Inst. C.E.

## Make Final Selection of Routes for Interstate System

Routes selected by the State highway departments for inclusion in a national system of interstate highways have been approved with few changes by Federal Works Administrator Major General Philip B. Fleming, according to the Public Roads Administration of the Federal Works Agency.

The new interstate system as mapped by the state highway departments, in cooperation with the Public Roads Administration, comprises the most heavily traveled highways in the present Federal-aid system, and includes extensions of the system through urban areas.

#### Many Routes Considered

Final designation of routes in the system was reached after careful consideration of proposed routes and a series of conferences between representatives of state highway departments and field officers of Public Roads to settle differences involving proposed alternate routes and connections at State lines.

The integrated system, as approved by the Federal Works Administrator, consists of north-and-south, east-and-west, and diagonal routes that will make it possible to travel from any section of the country to any other section by a direct route.

The system contains 37,681 miles of the Nation's principal highways, including 2,882 miles of urban thoroughfares. Additional urban circumferential and distributing routes are to be designated later, and 2,319 miles have been reserved for these routes.

Rural sections of the interstate system comprise only 1.1 per cent of all

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rural roads but carry 20 per cent of all rural traffic. The system reaches 42 state capital cities and will serve directly 182 of the 199 cities in the country having a population of 50,000 or more persons. Average traffic on routes comprising the system, exclusive of urban sections, was 2,693 vehicles per day in 1941 as compared with 1,439 on the Federal-aid system, 972 on state highways and 155 on all rural roads.

In many large cities depressed or elevated expressways will be built, making possible city travel at an average speed of 35 to 45 miles an hour, without stops for traffic signals and free of interference by cross-traffic. Depressed portions of expressways will be supplemented by parallel frontage roads for "local" traffic, and bridges will be constructed at intersections to serve cross-traffic. The urban expressways will be integral parts of the national interstate system.

In recommending routes for inclusion in the system, state highway departments were governed by provisions of the Federal-aid Highway Act of 1944, which required that "there shall be designated in the continental United States a national system of interstate highways not exceeding 40,000 miles in extent, so located as to connect by routes as direct as practicable the principal metropolitan areas, cities and industrial centers, to serve the national defense and to connect at suitable border points with routes of continental importance in the Dominion of Canada and the Republic of Mexico."

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The act further required that "the routes of the national system of interstate highways shall be selected by joint action of the State highway departments of each State and the adjoining States," and in another provision required approval by the Federal Works Administrator.

The Federal-aid Highway Act of 1944 authorized $500,000,000 in each of the three fiscal years following the war to assist the States in developing a three billion dollar highway program which would include improvements on the regular Federal-aid system, on highways in urban areas where the population is 5,000 or more, and on a Federal-aid system of secondary or farm-to-market roads in each State.

The sum of $225,000,000 was set aside from the authorized annual appropriation for improvements on highways in the regular Federal-aid system; $125,000,000 was made available for urban sections of the system only, including expressways, circumferential and distribution routes; and $150,000,000 was earmarked for State systems of secondary roads.

No specific sum was provided for development of the national interstate system; however, since the system is made a part of the Federal-aid system, the amounts provided for this system are available for the interstate system. The appropriations authorized have already been apportioned among the states.

In most states half of the cost of Federal-aid projects and up to one-third of the cost of right-of-way may be financed by the Federal Government. The exceptions are states containing large areas of land in the public domain where a higher rate of Federal participation is permitted.

Although the new interstate system follows, in general, the principal routes in the present Federal-aid system, it may be necessary in many instances to relocate existing highways or build alternate routes for express traffic in order to meet essential standards of width, grade, alignment, and control of access.

Routes included in the system, as well as the adopted standards of design and construction, conform in broad outline to recommendations contained in the report submitted to President


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Roosevelt in 1944 by the National Interregional Highway Committee.

Design standards for the system approved by the American Association of State Highway Officials on August 1, 1945, call for four-lane divided highways wherever the traffic volume is 800 motor vehicles in peak hours. For such highways in rural areas, a right-of-way of 250 feet is advocated as desirable. Traffic lanes 12 feet wide are recommended on all heavily traveled routes. Where traffic density exceeds 3,000 vehicles in peak hours, elimination of all cross traffic at grade is advocated.

Control of access to the interstate routes, particularly in and near cities, is considered essential. Large streams of traffic cannot move swiftly and safely if obstructed continually by vehicles entering and leaving an express route. Access points are to be placed as frequently as they are needed, but accomplishment of the main objective prevents permitting access at every cross road or street, business place, or residence. Many states do not yet have adequate legal authority to control access.

#### 1944 Legislation

The National Interregional Highway Committee's report was transmitted to Congress by the President on January 12, 1944, and in December of that year Congress enacted legislation requiring that the interstate system be designated and authorizing Federal appropriations for highway construction in the first three post-war fiscal years.

State highway departments were requested to select routes for inclusion in the national interstate system and replies were received from all states in 1945. Since that time representatives of State highway departments and the Public Roads Administration have been engaged in ironing out differences concerning alternate routes and connections at state boundaries.

Meanwhile work has been started on improvements on sections of the Federal-aid system included in the national interstate system, for which plans had been completed prior to V-J Day. Development of the national interstate system of highways embodying standards of design recommended by the Public Roads Administration and the American Association of State Highway Officials is a long-range program to be carried out over a period of years.

## Conduct Survey of Kentucky Roads Expenditure Program

A survey of Kentucky's highway system, with particular emphasis on the extent the state should aid in the construction of rural roads, will be conducted by the Public Administration Service, Chicago.

Kentucky spent $5,000,000 of the state road fund's total of $27,000,000 on rural roads last year and will spend another $5,000,000 on them this year out of estimated receipts of $30,000,000, according to Highway Commissioner Watkins, who said the survey would determine whether current state aid to rural (county) roads is too little, enough, or too much.

The survey, which will be conducted at a cost not to exceed $15,000, will be completed early in October and promptly given to the public and the State Legislative Council for consideration, Watkins said. He added that results of the survey might assist "fellows running for governor" in learning just how much state money should go to rural roads in the future.

## Ask Use of Meter Revenue to Finance Parking Facilities

The plunk of millions of nickels into parking meters all over the country, is sounding a warning note to highway user groups. These groups, always concerned over diversion of highway user taxes to other than highway purposes, wonder if excess parking meter receipts should not be used to create new off-street parking facilities instead of going for other, unrelated municipal spending.

While there are no general figures as to the amount of this "diversion" of parking-meter nickels to other purposes, it is said to be heavy in some cities. One town for which figures were published recently took in much more money with its meters the first year than the meters themselves cost to buy.

User groups acknowledge that there are other expenses connected with meters beside their purchase price, but believe that after these are paid, the rest of the revenues could well go to relieve the parking crisis that grips almost every American city.

The National Highway Users Conference does not advocate parking meters, but feels that if towns have meters, or plan to buy them, they should not make them "tax collectors" without giving the motorist something in return. "The original function of the parking meter was supposed to be a fairer division of parking time at the curb. Few, if any, cities that installed them ever planned that they should supply general revenue."

"Should a city suffer some loss in this revenue through using excess parking meter revenues for off-street parking or other parking facilities, that loss might be more than compensated by the increased trade that improved parking should bring," user groups declare.

Some states at legislative sessions this year have adopted bills supporting such plans. A North Carolina law allows parking meter revenues to be used to provide free parking lots. Other states, including Florida, Maryland and New Hampshire, provide that certain cities can use parking meter revenues for setting up parking lots, but that space in the lots themselves may be metered or otherwise rented.

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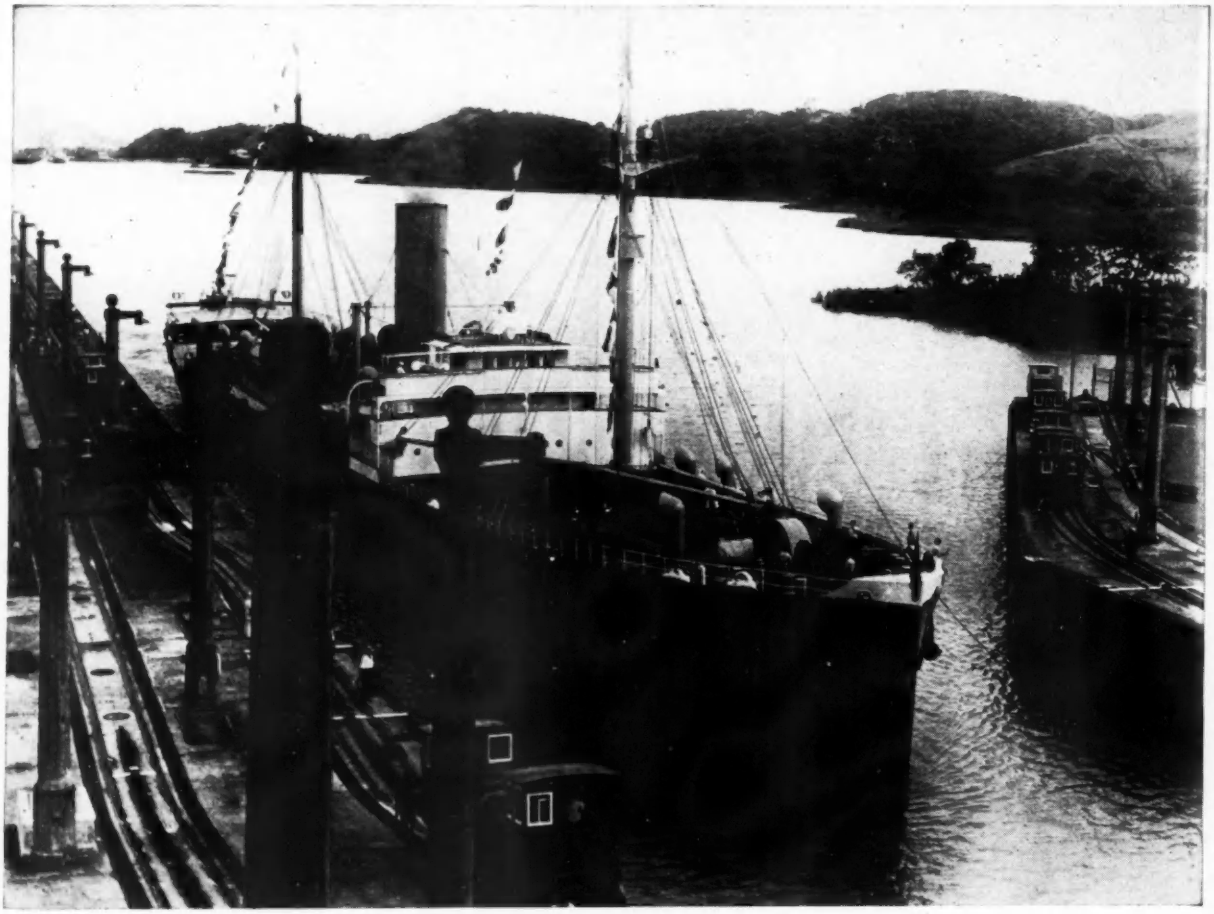

• The "Steel Exporter" enters Pedro Miguel Locks in the course of the hundred thousandth commercial transit of the Panama Canal. Most of the conversion schemes now being considered call for elimination of this set of locks.

## Panama Canal

*(Continued from page 539)*

All the conversion plans assume widening of and some channel relocations, hence shortening and removal of considerable curvature. Also the Navy has insisted no new locks shall have chambers less than 200 feet wide and 1500 feet long; also that locks shall have faster swinging gates and quicker spilling times of chambers. Many road, railroad and village relocations will be involved in any of the schemes.

There are interesting and unprecedented phases in the conversion to sea level. It may be done in one of two methods: either in a three-step process, dropping from El. 85 to 50, from dry excavation by power shovels to El. 85 at widenings or relocations, then conventional dredging by 50 to 30 (eliminating locks at each stage), and from 20 to —40; or in one step by specially designed units for deep dredging (dredge manufacturers have late-


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ly worked out machines of two types that are said to be capable of dredging to 135 feet deep) below the surface of Gatun Lake. Since there will be at least three years' dry excavation needful in the Gaillard Cut area, one such dredge may be tried out. If successful, its use would save much time and construction cost.

### New Locks Needed

In order to reach sea level (El. —40 bottom depth), the present channel would have to be excavated another 85 feet in many places. Also, another lock system would have to be installed, as the canal could operate as a sea level channel only 30 per cent of the day, due to rise and fall in tides. The Pacific side has 20-ft. tides, compared to 2-ft. tides on the Atlantic end of the canal.

The primary consideration in proposing a sea-level canal is closely associated with the strongest argument against such a plan. While it seems true that if the locks of a sea level canal were bombed, the channel would still be navigable 30 per cent of the day, the problem of slides would be much intensified by the deep cuts that would be necessary. The same bombs which strike out locks might set off disastrous slides in nearby channels. Other bombs could destroy the many new stream diversion dams, levees, and spillways this plan must include.

### "Guess-Estimates"

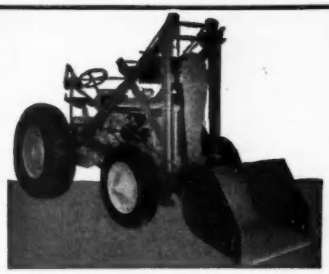
Estimates of yardages and costs at this time are conjectural. However, it is apparent they will be in the high millions and low billions, respectively, with sea level schemes exceeding the Terminal Lake proposal 3 to 5 times. Guess-estimates put the relative percentages of dry to wet excavation yardages at about 60 to 40 per cent varying with the plan finally selected.

Interesting has been the study's thoroughness in determining the causes of troublous navigation in restricted channels. That is, the sheerings and bad propeller effects sometimes giving sideswipings against Gaillard Cut's steep and rocky banks; or water currents from lockage-drafts; lock-entrance or wing-wall currents from the inter-mixings of fresh and salt water; water swirlings from propellor-bank effects or shoal water swirls about an overloaded, under-powered ship's propeller, etc.

### Model Tests

These conditions have been similated by hydraulic models of the actual protype they represent. The ½-mile long 1:100 scaled sea-level model near Miraflores Locks is equipped with terminal harbor tidal similators and other pertinent features and has been of great help. At Carderock, Maryland, the Navy's well known Taylor Model Basin Laboratory has been adapted and much used in many special tests on the action of ships in restricted channels. Captain Miles Du Val, USN, formerly Port Captain at Balboa, is liasion officer for the Navy for these tests and in general cooperation with the special investigation.

Apparently this year will see definite recommendations for an-

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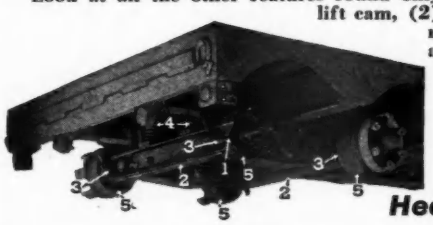
• Deep, wide flange main beams running the full length of the trailer, I-Beam sections for cross-members and outriggers, improved, fabricated gooseneck, and all electric-welded construction. Look at all the other features found only on Jahn tandem axles: (1) constant lift cam, (2) two full-width axles attached to longitudinal rocker beams, (3) worm gear type slack adjusters at each wheel, (4) heavy coil springs at each axle and (5) positive equalizing braking at each wheel regardless of position of axle.

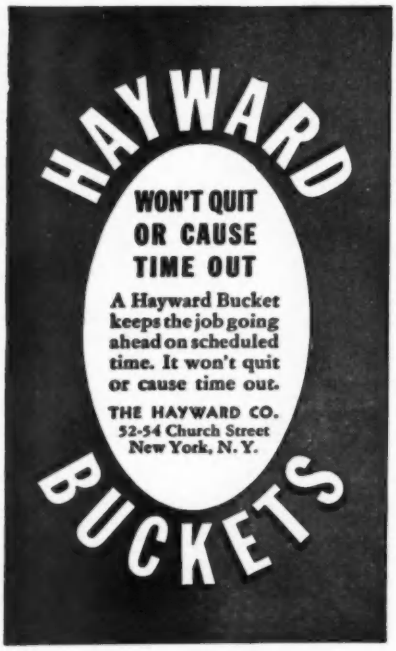



JAHN TRAILERS ALL OVER The WORLD!

**C. R. JAHN COMPANY**
Dept. 1349
1106 W. 35th ST. CHICAGO 9, ILL.
***Heavy duty trailers from 5 to 100 tons.***

swering "How, and when and where will the Panama Canal be modernized?" Once, a canal commission and a President definitely recommended a lock-level Nicaraguan Canal and Congress approved it too. Then events shaped fast and the President and Congress switched to Panama; the new commission's majority vote that time was for a sea level canal. That was overruled and not until 1906-07 did the present lock level plan win.

What's to happen? Apparently the best minds agree the atom bomb could put either type of canal out of commission. Other considerations must be eventually decisive. It may be that the 3 to 5-times more expensive sea level (with tidal locks), and many say poorer navigational waterway, may seem too expensive in these Congressional economy days.



HAYWARD
WON'T QUIT
OR CAUSE
TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD CO.
52-54 Church Street
New York, N. Y.
BUCKETS


## *Cellars, Sewers*

*(Continued from page 543)*

from here or can be delivered to a 24-in. x 75-ft. Barber-Greene conveyer which takes it to a 60-ton hopper where it is ready for loading to cars.

One of the changes now in process includes addition of a 2-chute bin which can deliver material either to the rewash screen or to a 3 x 7 Hardinge ball mill which will deliver it to a third 3 x 8 screen. A 24-in. by 60-ft. portable Barber-Greene conveyor will take it from there to the loading hopper. This additional step will insure maximum elimination of sand or clay and will be used mainly when the loading shovel is working in spots in the quarry where appreciable amounts of clay (from the previously mentioned crevices) are mixed with the stone. A ¼-yd. Bucyrus-Erie and a ½-yd. Bucyrus-Erie (Army surplus with a white star still on its wood cab) are used with clamshell buckets in the plant. The former, operated by Henry Thor, loads highway gravel or concrete sand to trucks. The latter transfers the pebbles from stock pile to a hopper feeding a bin which, in turn, loads them to cars for shipment to Ferro Silicon plants. Owen and Williams digging and rehandling buckets are available for both the plant cranes.

Hauling units used at the plant include three Truck Engineering Corporation semi-dump trailers with Gar Wood cam and roller bodies, each having a capacity of approximately 15 tons. These semi-trailers are hauled by International K7 and KS 8 tractors. Material is weighed out on a 20-ton Howe platform scale. The road gravel is sold locally over a 25-mile radius; the concrete sand is trucked to Warren, Painesville, Chardon and Cleveland.

### Truck Fleet

Other trucks used in hauling and concrete work are: Two International 3-ton K7's; two D40's and two D35's, the latter four with Gar Wood and Galion dump bodies; and a D35 with a 2-yd. Blaw-Knox truck mixer.

Personnel of the Sidley organization, in addition to those already mentioned, include: Mrs. Cork, bookkeeper; Rodney Morris, office manager; Leonard Geisman, chief mechanic; George Medvec, driller (who has his son helping). Truck drivers on the regular payroll are: Bernard Donavan, John Vicol, Carl Warner, Dave Shaughnessy and Don Potter. Earle Lemponen usually operates the La Plante-Choate bulldozer on a Caterpillar D4.

### The Boss Took Over

He wasn't there the day we were there, though. Mr. Sidley was, and he went back on it to finish up the new location just as soon as he'd finished telling me the things you've just read.

He didn't say it in so many words, but I could tell he was proud of the people working with him. Most of them have been with him a long time, and I think you'd agree he has a right to be proud of them.

And you can be sure, too, they're rightfully proud of him and what he's done.

HERE'S your ideal small power plant for lights, ventilating fans, or other electrical equipment.
MOON Generators
TURBO and BELT DRIVEN
for LIGHT and POWER
Important MOON features include:
1. GOVERNOR AND COMPOUND WINDING on Steam-driven models prevent excess voltage output which might injure electrical apparatus . . .
2. ONLY 2 EASY-TO-REACH OILING POINTS . . .
3. AUTOMATIC CUT-OFF on larger capacity Steam-driven models prevents overload damage to generator . . .
Model 8
(Steam)
Models from 1 to 7½ KW capacity.
Send now for illustrated circulars
Moon MANUFACTURING CO.
ESTABLISHED 1893
118 North Jefferson St., Chicago 6, Illinois, U. S. A.
Send in your old Moon generators for rebuilding now — we can give prompt service.

## 1000 Years Ago

*(Continued from page 546)*

When the Spanish conquerors came in 1540 they took over the turquoise diggings and for a time worked them with Indian slave labor. For a hundred years, unbearable conditions were imposed upon the native miners who still worked without metal tools. A great rock fall or cave-in came in 1680 and many miners were killed. It is generally conceded that this cave-in did much to "trigger" the great Indian uprising of the same year. For twenty years the Spaniards were completely expelled from the entire territory which is now the United States and it was only after promises of no more slave labor mining that they were allowed to enter again in 1700. In the meantime, more of the overhanging pit workings had caved in, pine trees were growing over the old dumps, and the turquoise mining seemed to have reached the end.

### Reopened in 1879

But mining fever runs in great world cycles. In 1858, W. P. Blake, an American scientist, examined the region and marveled at the tremendous amount of work which had been done by the Indians. In 1879, some miners were sidetracked from their original destination of Leadville, Colorado, and they reopened some of the mines once more. Mining on some of the adjacent hills was started in the eighties and the nineties. One stone is said to have sold for $6000 and the year of greatest production (1891) saw the region produce half a million dollars in turquoise.

Since 1900 mining has continued in a sporadic fashion with few miners making wages at it. During the late 1930's the ancient workings at Mount Chalchihuitl were opened by the late Professor P. L. Schmidt. The professor was an experienced mining man. By shrewd selections of drift sites he quickly drove into the underground workings which had been obliterated by the cave-in of 1680. His drift route was marked, in places, by stone hammers, crushed pottery lamps, and the crushed skeletons of the victims of the rock fall.

It is a strange thing to stand in one of those old workings today. The ceiling or "back" of the stopes are smoke-blackened from the fires which shattered the rocks back in the days before Christopher Columbus was born. The scars of the stone hammers are still on the walls as fresh as they were when Eric The Red harried the British Isles. In a few places, thin stringers of green and blue still show the job to be an unfinished one.

But when you come out again to the light of day and look at the pits which mark the original excavation you are awed by the magnitude of such a task. A million yards or more of excavation without drill, pick, shovel, tram-car, carbide lamp, metal tool, or explosives. Just manpower, time, and patience!

With modern explosives and excavating machinery the Chalchihuitl pits and underground stopes would be a comparatively easy task. But what a task these pits must have been for the generations of workers who toiled and died there!

Lincoln, the "Great Emancipator" is revered because he struck the fetters from thousands of slaves. Nobel (perfector of dynamite) and many other inventors did much the same thing — emancipated thousands of people and raised them to a level where their toil was much less menial and far more remunerative.

In the days of ancient Egypt, whole nations had to be enslaved to raise some monuments to a vain king. Machinery, as we know it, was unknown and men were cheap. As we contemplate the works of ancient times in Egypt and the great excavations of America's first miners, we wonder what a machine is really worth. Certainly its value cannot be measured in mere money. Its value must, inevitably, include the sweat and blood of the generations of slaves which have been freed from infinite toil.


**The HEAVIER the Lift, the FIRMER the Grip**

YES, that's right! Bucyrus-Erie Rock Grabs welcome the heavier, more difficult lifting jobs. Operated by compression and friction, these tough rock-handling units don't have to get their jaws under a load to lift it . . . two approximately parallel side contacts are all that is necessary.

Mounting a Bucyrus-Erie Rock Grab, the work capacity of your crane can be greatly increased. The handling of large tonnage rocks will be on the same level as clamshelling of loose material. With one man at the levers and another on the job helping to guide the Grab, rocks can easily be tipped, carried, and laid down exactly in place without resetting, shifting, or jacking.

Produced in size ranges from 2½ to 20 tons, Bucyrus-Erie Rock Grabs are well worth your further investigation.

BUCYRUS ERIE

South Milwaukee Wisconsin

# NOT in the *Contract*

Jackie, aged eight, was returning from a visit to his grandmother. "Oh, the train was fun," he said when his mother met him. "But," he added, puzzled, "Some soldiers were mean to me. You see, when I got on the train, a nice lady came and sat down and we talked till she got off. The minute she left, two soldiers across the aisle came over and bawled me out. They said, 'You little weasel, why didn't you say that babe wasn't your mother?' "

"I pose in the nude for an artist on Mondays, Wednesdays and Fridays."

"Do you enjoy watching him paint?"

"No, he paints on Tuesdays, Thursdays and Saturdays."

With her hand on the light switch, the little woman interrupted her chatter to inquire: "Is everything shut up for the night, dear?"

"Yes, sweetheart. Everything else."

A Kentucky farm couple sent their only daughter to college for several years. Finally she graduated and the old man took the family jalopy and went to the railroad station to meet the girl and take her home. She crawled in beside her dad, in his clean but worn overalls, and snuggled beside him and in a confidential whisper she said: "Daddy, I have a confession to make; I ain't single any more." The old man dropped his head low in remorse and wrung his hands as he replied: "After all the sacrifices that your mother and I have made to give you a good education, you still say 'ain't'."

"Really," said Mrs. Scott, reading her paper at breakfast, "the world is getting worse and worse. Just listen to this advertisement. 'Typist wanted, must be young, fast, and experienced.' "

"Hey," cried Satan to the new arrival. "You act as if you owned the place!"

"I do," came the reply. "My wife gave it to me before I came."

Two men were flying east in a passenger plane, making the first air trips of their lives. The plane touched down at St. Louis and a little red truck sped out to its side, to refuel it. The plane landed again at Cleveland, and again a little red truck dashed up to it. The third stop was Albany, and the same thing happened.

The first of the two men looked at his watch and turned to his companion.

"This plane," he said, "makes wonderful time."

"Yep," said the other, "and that little red truck ain't doin' bad either."

Two rookies in the cavalry couldn't tell their horses apart, so they cut off the mane of one of the steeds. But it grew back, so they cut off one horse's tail. That grew back, too, and they were in a dilemma until one of the boys hit on a bright idea. "Let's measure them," said he. And sure enough, that worked. The black horse was two inches taller than the white horse.

A married couple was sleeping peacefully when the wife suddenly shouted out in her sleep: "Good Lord! My husband!"

She was awakened by the crash of glass as her husband waked with a start and jumped out the window.

Old Lady: "Doctor, were you in the war?"

Doctor: "Yes, madam, I was a naval surgeon."

Old Lady: "My! My! How you young men do specialize!"

"Joe used to work on the Lincoln Highway."

# Don't get caught with your lines down...

## RIG UP WITH *Tiger Brand*

## FOR TROUBLE-FREE SERVICE

● In U·S·S American TIGER BRAND Wire Rope, you have a rope with the strength, toughness and flexibility needed to withstand the severe stresses and abrasive wear to which your hoisting and hauling lines are constantly subjected.

Made to close tolerances and unvarying quality standards, TIGER BRAND's Excellay Preformed construction eliminates or lessens common causes of rope trouble—rotating in the grooves, bending fatigue, kinking, drum crushing, and abrasive wear.

All of which means less time out for repairs and replacements, more efficient, more profitable operation all the way through. In addition, TIGER BRAND Excellay Preformed Wire Rope is easy to handle . . . can be rigged quickly . . . requires shorter breaking-in period. Is it any wonder that with construction men everywhere, *the BIG Demand is for* TIGER BRAND!

### IMMEDIATE DELIVERY

in any quantity now available on most types and sizes. Write, wire or call your nearest supplier. Anticipate your needs and stock up now. Keep an extra reel on hand. Don't get caught with your lines down!

**AMERICAN STEEL & WIRE COMPANY**
*Cleveland, Chicago and New York*
**COLUMBIA STEEL COMPANY**
*San Francisco*
Tennessee Coal, Iron & Railroad Company, Birmingham,
*Southern Distributors*
United States Steel Export Company, New York
**UNITED STATES STEEL**

*The BIG Demand is for Tiger Brand*

# *New* trade literature

**Title: Tractor Folders**

Subject: Two folders, describing the power and work features of the new "Caterpillar" diesel D6 and D4 tractors, have been published by the manufacturer.

Outlining the design and manufacturing features which are said to have brought increased power to the two tractors, the folders include specifications of the machines and graphic illustrations of their physical makeup.

Where to Get: Caterpillar Tractor Co., Peoria 8, Ill. Ask for Forms 10229 and 10230. (Free)

**Title: Truck Body and Hoist Bulletin**

Subject: This illustrated 6-page bulletin tells the story of the complete line of Kewanee truck bodies and hoists. It includes specifications and detailed pictures of both the bodies and hydraulic hoists.

Where to Get: Kewanee Manufacturing Company, Kewanee, Ill. Ask for Bulletin No. KBH 647. (Free)

**Title: Roller Bulletin**

Subject: A 6-page, 2-color bulletin, describing the Wheeler 3 to 4-ton Tandem roller, is just off the press.

The features highlighted by the bulletin include single lever clutch and shift; one lever steering control; unobstructed vision; and mobility.

Where to Get: Shaw Sales & Service, Los Angeles, Calif. (Free)

**Title: "Lessons in Arc Welding"**

Subject: This, the third edition of "Lessons in Arc Welding," is 158 pages long; includes 228 illustrations. The book, which gives complete and thorough instructions in all phases of arc welding, is designed to assist both new and experienced welders as well as all persons interested or concerned with the subject.

In addition to welding fundamentals, "Lessons in Arc Welding" covers welding with alternating current; direct current welding; new procedures covering large electrodes with recommendations as to their use; newest electrodes and their employment; lessons on pipe welding; and data on the qualifications of welding operators. Another important feature is the complete discussion of distortion with recommendations regarding its prevention and control.

The last 30 pages are devoted to a "Questions and Answers" section which may be used for quizzes and self-examination.

Where to Get: The Lincoln Electric Company, Cleveland, Ohio. (Price $0.50)

**Title: Shovel Booklet**

Subject: A 40-page booklet covering the P & H 1055 Shovel has just been published.

Printed in two colors, the booklet has many large pictures of the shovel at work in coal fields, quarries, on irrigation projects, and other jobs. Features of the shovel are covered in both text and picture form.

Where to Get: Harnischfeger Corporation, Milwaukee, Wis. (Free)

"Better snap it up—I think we're behind schedule!"

**Title: Report on Arc Welding**

Subject. Specifications for more than 60 German welding electrodes are included in a report on arc welding published by the Office of Technical Services, Department of Commerce.

Written by investigators for the British Intelligence Objectives Sub-Committee, the report says that German electrodes were generally inferior to British and American Products. It claims that there was inadequate coordination between designers of armor welding electrodes and the field of welding research generally. The manufacturers of welding materials seldom received reports on the performance of tanks, ships, and submarines welded with different types of rods.

Many German electrodes were modifications of conventional types, designed to conserve supplies of critical materials.

Where to Get: Superintendent of Documents, Government Printing Office, Washington, D. C. Ask for Report PB-58368 (Price photostat, $7.00; microfilm, $2.00).

**Title: Non-Electric Magnetic Pulley Booklet**

Subject: A new 8-page, 2-color illustrated booklet on the Eriez permanent Non-Electric Magnetic Pulley has just been published. In addition to a detailed description of the construction of the pulley, the booklet tells how the pulley automatically removes tramp iron or other ferrous metal contamination from materials in process.

Engineering data is given to aid in selection of proper units.

Where to Get: Eriez Manufacturing Company, Erie, Pa. (Free)

**Title: "Trenchliner" Bulletin**

Subject: Parsons Wheel Trenchliner, the 200, a new pipeline and drainage trencher, is completely described in a new illustrated bulletin.

Action pictures, detail photos, and drawings show and explain features like the pivot wheel mounting, reported to simplify grade adjustments, particularly in drainage work. Also shown is the new Parsons tile chute. Specifications, included in the bulletin, indicate that Parsons 200 Trenchliner digs up to 5 feet 6 inches deep, with a maximum digging width of 24 inches. Digging speeds range from 2.5 inches to 20 feet per minute.

Where to Get: Koehring Company, Milwaukee 10, Wis. (Free)

**Title: Welding Accessories Catalog**

Subject: This 16-page catalog describes the complete line of welding accessories handled by the Metal & Thermit Corporation.

Where to Get: Metal & Thermit Corporation, New York, N.Y. (Free)

**TO ADVERTISE:** All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

**TO INQUIRE:** Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

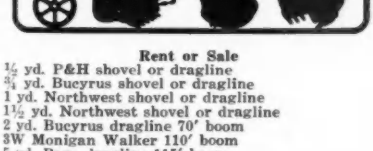
Bucyrus-Erie Class 230 (No. 11229) steam dragline. Equipped with 175' boom, 6-yard bucket. Mounted on self-propelled trucks complete with track sections and moderate stock of spare parts. Completely overhauled 1½ years ago, in good operating condition. Located Littleton, Alabama. Price $25,000.

Box 3228

**For Sale**
NORTHWEST GAS COMBINATION CRANE AND SHOVEL
MODEL #104, SERIAL #2329
50' boom and 1 yd. dipper
Now operating at our Carpentersville, N. J., plant
**PORTLAND SAND & GRAVEL COMPANY**
**Portland, Pennsylvania**
Telephone: Portland 44

One Model 32-B Bucyrus-Erie shovel, also 50' boom clamshell equipment.
One P&H Model 855-B 2 cu. yard shovel, General Motors diesel, new 1946. Box 3230

One Bucyrus-Erie D2 shovel, diesel powered. Serial No. 4895, with boom and one yard dipper. Also 42' boom with log grapple.
**Goodman Lumber Company**
**Goodman Wisconsin**




**Rent or Sale**
½ yd. P&H shovel or dragline
¾ yd. Bucyrus shovel or dragline
1 yd. Northwest shovel or dragline
1½ yd. Northwest shovel or dragline
2 yd. Bucyrus dragline 70' boom
3W Monigan Walker 110' boom
5 yd. Page dragline 115' boom
20 yd. Marion 170' boom
**A. W. NEVERS** **Mt. Pleasant, Iowa**

One 3½ cu. yd. Red Arch Type AY heavy duty dragline bucket complete with all fittings. Almost new condition. Box 3222

**CONVEYOR EQUIPMENT**
Seven flights complete with motors, starters, pulleys, shafts, belting and idlers. Flight "A" 600' 60", price $59,500; Flight "B" 225' 60", price $26,000; Flight "C" 150' 60", price $29,000; Flight "D" 440' 48", price $22,900; Flight "E" 1200' 42", price $53,500; Flight "F" 1000' 36", price $42,700; Flight "G" 1000' 36", price $45,200. Miscellaneous conveyor equipment price $129,224.
**MORRISON-KNUDSEN COMPANY, INC.**
**P. O. Box 450** **Boise, Idaho**

Two 1947 TD18 International bulldozers with double drum power control.
Three 1944 TD9 International Bucyrus-Erie shoveldozers.
2-yd. P&H crane, 50-foot boom, fairlead, Caterpillar 17000 motor, mounted on cats, as good as new.
1½-yd. Osgood crane, 70-ft. boom, mounted on 12 12x24 tires, good condition.
Buckets—new—one ¾-yd., one 1-yd. Pettibone-Mulliken, one ¾-yd. Link Belt medium duty dragline.
Complete shovel front for Model 6 Northwest.
Crowd chains for ¾-yd. Koehring, type 1641AA, 144 links to the set.
Miscellaneous parts for shovel buckets, including doors, sides, manganese fronts and lips, for Northwest 2½-yd. 80D, Northwest 2-yd., Lorain 2½-yd., Lorain 1½-yd. and Link Belt 1- and 1¼-yd. buckets.
Caterpillar D7 bulldozer and Caterpillar D7 hydraulic angledozer.
Derrick, A-frame, tractor mounted, for use with Caterpillar D7, non-revolving complete with fairlead assembly, capacity 12,000 lbs. at 5' radius.
Heil winch for Caterpillar D7.
Mixer, rotary tiller, Seaman model MHD-72, heavy duty, two tires, trailer hitch, Waukesha engine, 75" cutting width, with drive from engine through twin disc clutch, front end control, new.
Woolridge scraper, model BBS, carryall, with two 14x20 front tires, four 14x20 rear tires, 8½-cubic yard, slightly used.
Portable coal conveyor, 2 rubber tired wheels, self-propelled, Wisconsin motor.
Centrifugal Allis-Chalmers water pump, type SSDHB, model MBK, iron body, bronze fittings, V-belt drive, 2" suction, 1½" discharge, steel base Wisconsin 1-cylinder air cooled engine, new.
Checker trailer tank, 350-gallon, serial W256.
4" Peerless pump, powered with 4-cylinder Wisconsin motor.
Kerrick Kleaner, slightly used.
50-ton Rogers trailer on solid tires—new tires and new deck.
Wheels and tires for 50-ton Rogers trailer—2 40x14 front, 8 28x12 rear.
**R. E. CUNNIFF**
**393 Brookline Street** **Newton Center 59, Mass.**
**LASELL 4300**

New
**BUCYRUS - ERIE**
**PARTS!**
From U. S. Govenment Surplus
Parts For: 33B, 37B, 54B, and 120B.
Gears, Pinions, Bearings, Bushings, Lining, etc.
**Immediate Delivery From Available Stock. . . . At a Savings While They Last!**
**FURNIVAL**
**Machinery Company**
5405 Lancaster Ave., Phila. 31, Pa.
TRinity 7-5200

**Dredge For Sale**
8 cu. ft. placer gold dredge 30' digging depth, approximately 100' stacker. Main power two diesel 445 hp engines—54' x 112' x 10' hull. New, 1940. Box 3229

TD-40 International tractor with 4½ yd., four wheel, Bucyrus-Erie scraper complete with hoist. Good operating condition.
**KENTUCKY CLAY MINING CO.**
**Mayfield, Kentucky**

American locomotive crane, capacity 37,800 lbs. at 15 ft. radius, Waukesha 100 HP gasoline engine, boom length 50 ft., condition good, ready to operate, $9500.
P&H 1 yd. dragline type 600A, without bucket, Atlas Imperial diesel, boom 40 ft., requires crankshaft reground and cat links replaced or rebored and rebushed, $4900, includes new repair parts worth $500.
**Foley Brothers, Inc., Colstrip, Montana**

Modern floating washing plant, capacity 200 yards per hour. Located Northern California on paved road near railroad. Available now. For particulars address owner, William von der Hellen, Box 1026, Medford, Oregon.

1—Classifier, Dorr 8'x26' DSD-1638C.
1—Crankshaft, metallized for 6-cylinder Wisconsin engine type E, series 12, bore 6x7.
5—Crankshafts, metallized for 6HBISD Cummins diesel engine.
1—Lot new parts for 2' Symons crusher.
1—Compressor, IR, size 315, Model GK, gas.
1—Crane, Ohio steam locomotive, 20-ton capacity.
1—Dipper, 4-yard 120-B manganese.
1—Dissociator, ammonia 100 CFH HT.
1—Drill, Parmanco Sr. horizontal.
1—Drill, Hardscog Model E-9 horizontal.
1—Drifter, G.D. D-79.
1—Drifter, G.D. D-89.
47—Jackhammers, IR RB-12.
1—Switchgear, G.E. 300 K.W., 600 volt.
1—Fan, Sturtevant FB, 1500 CF.
1—Fan, Vano, 800 CF blower.
1—Generator, Whse, 120 KW, 440 volt, 157.5.
29—Hoists, IR 20-HP double drum electric tugger.
1—Hoist, National Cage size No. 137, 37 HP.
1—Hoist, Ottumwa No. 3396, 100 HP.
1—Hoist, Ottumwa No. 3397, 75 HP.
1—Hoist, Ottumwa No. 4197, 700 HP.
2—Jigs, Bendelari 2 Cell 42".
6—Jigs, Bendelari 3 Cell 42".
2—Jigs, Nordberg 2 Cell 42".
1—Jig, 4 Comp. 42"x92 A.C.
1—Loader M-8, Athey Truss Wheel Mobil.
1—Pump, AC two stage turbine, 1600 GPM, 225' Head, 135 HP motor, 440/3/60.
1—Pump, FM turbine, 1750 GPM, size 6, Type 705, 12 stage.
1—Pump, Hydroseal Frame C, with FM motor.
8—Screens, single deck vibrating 3x8, 3x12, 4x10, 4x12, 5x12.
1—Tractor, Case Model DI, with Hough Sweeper.
5—Trucks, Euclid Model 18 FD rear dump.
5—Haulers, Euclid Model 27-FDT-27W 20-ton bottom dump coal with Cummins engine.
1—Truck, Dodge Carryall Model WC-87USA 1941.
1—Welding machine, Hansen with 6-cylinder engine.
1—Welding machine, Westinghouse with 8-cylinder engine.
1—Valve, 12" Std. Flgd. Clayton Float—New.
**Phone Cedar 2565**
**BUTLER BROTHERS**
**137 East 8th Street** **St. Paul 1, Minn.**

*(For Sale continued on page 584)*

## For Sale

*(Continued from page 583)*


**ALL-STEEL DERRICKS**

35—30 ton capacity BRAND NEW Wiley all steel stiffleg derricks, 32' masts, 60' booms, complete; can furnish with gasoline, electric or steam hoists.

**ALSO**

Air compressors, bins, boilers, cable, conveyors, cranes, crushers, engines, hammers, conc. mixers, light plants, pneumatic tools, pavers, pumps, saw rigs, welders.

**EQUIPMENT CORPORATION of AMERICA**

CHICAGO 12 — 1170 S. Washtenaw Av.
PHILADELPHIA 2 — 1501 Race St. Schaff Bldg.
PITTSBURGH 30 — P.O. Box 833, Dept. E.E.
NEW YORK 7 — 30 Church St., Dept. E.E.


Complete backhoe attachment for Bucyrus-Erie 29-B. Excellent condition. Located Kentucky. Box 3196

TRUCK PARTS

New critical spare parts available for INTERNATIONAL 6 x 6, model M-5H-6.

L. M. Keller
133 N. Ridgeland Avenue — Oak Park, Ill.

B-E 37-B shovel No. 20302.
B-E 44-B shovel No. 17960.
B-E 44-B shovel No. 18121.
Size 400 Vulcan pile extractor.
All in first-class condition. Box 3223

8 Brand new 6DT-468 Buda Lanova diesel engines, 6 cyl. 4¼" x 5½", governor set at 1600 rpm (no load). Without power take off clutch or radiator. F.O.B. South Milwaukee, Wis. Box 3225

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS

2—½ cu. yd. Drag Shovel Dipper—17-B.
3—½ cu. yd. Skimmer Scoop Dipper—17-B.
1—¾ cu. yd. Welded Dipper—21-B.
1—1½ cu. yd. Heavy Duty All Cast Dipper 42-B.
1—2 cu. yd. Rock Dipper—75-B.

F.O.B. Works

Write for any further information desired

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee — Wisconsin

**Surplus Swivel Hook Double Sheave Blocks**

2 10 ton "American" 14" swivel hook double sheave block, diamond pattern with cast steel sheave bushed with self lubricating bronze bushings, grooved for ⅝" rope. Groove diameter 12¼" equipped with 100 lb. cheek weights. 2½" swivel hook. Approximate shipping weight 234 lbs. American Hoist & Derrick Co. Dwg. 1-M-6560.

1 10 ton "American" 14" swivel hook double sheave block, diamond pattern with cast steel sheaves bushed with self-lubricating bronze bushings. Grooved for ¾" rope. Groove diameter 10½" equipped with 100 lb. cheek weights. 2½" swivel hook. Approximate shipping weight 285 lbs. American Hoist & Derrick Co. Dwg. 1-M-6560.

1 40 ton "American" 24" swivel hook double sheave block diamond pattern with cast steel sheaves grooved for ⅞" rope. Sheaves to be bushed with plain bronze bushings, with center bored sheave pin and ¼" Alemite hydr. grease fitting No. 1980 equipped with 300 lb. cheek weights and 5½" swivel hook. Total weight of block 1190 lbs. Dwg. BEFP 1-M-6560.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin


New

**DERRICKS**

(ALL-STEEL, STIFF-LEG)

**3 Available!**

From U. S. Government Surplus. 30 Ton at 38 ft. radius, 60 ft. Boom with Bull Wheel.

**Priced At a Saving!**

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## WANTED

Wanted: Coal stripping excavators for long time job in high priced field, high quality coal, gentle rolling cover, mostly shale and dirt in Southern field. Job calls for stripping and loading into our trucks. Box 3232

Wanted: Haulage contractors on large coal job. Good roads, long haul, together with long term contract. Must have large equipment. Southern field. Box 3233

One of the most experienced soil erosion and dam building contractors in South Africa anxious to contact large firm in America with plant to tackle 20 million pound project. Further scope of 100 million. Prepared come over and discuss project provided passage paid and expenses. Please cable immediately. **J. D. Kunhardt, Box 10, Adelaide, Cape Province, South Africa.**

An old established earth moving firm in South Africa anxious to contact any person who could purchase even second hand 200 D8's or TD40's or largest Allis-Chalmers tractors with bulldozers, scrapers, and rooters. Cable controlled or hydraulic. Liberal commission. Would fly over if you secure the plant first. Cable immediately. **Kunhardt, Box 10, Adelaide, Cape Province, South Africa.**

**WANTED**

One shovel front complete for Bucyrus-Erie 37-B late type machine having 20½" spread between centers of boom foot castings. Must be first class condition. Wire reply to: K. A. Forbes, Mechanical Engineer, Dept. of Highways & Public Works, Halifax, N.S., Canada.

## HELP WANTED

**HELP WANTED**

Dragline operators for work in Central America for large American Company. Good salary plus yardage bonus.
Good living conditions. Expenses paid to job site.
Machines from ½ to 2½ yards.
Excellent opportunity for two-man teams accustomed to working together.
Write today for full information about this outstanding opportunity. Box 3201.

## POSITIONS WANTED

Shovel operator. 15 years' experience coal stripping. Past 10 years on Bucyrus-Erie 950-B. Know how to repair and maintain same. References on request. Box 3226

# Notes from the manufacturers

**The Herman Nelson Corporation,** Moline, Ill., has appointed Robert C. Koehring Manager of its Portable Products Division. In his new position, Mr. Koehring will coordinate the activities of all departments of the company to further the development and marketing of its line of portable products.

**The Frank G. Hough Company,** Libertyville, Ill., announces the appointment of Charles R. Boreham to the position of Parts and Service Manager. He will be in charge of part sales and will supervise the servicing of Hough Payloaders and Loader and Sweeper attachments.

**R. C. Call Company,** Steubenville, Ohio, Marine and Industrial Distributor for General Motors Series 71 diesel engines, announces the completion of a new sales and service plant. The building, a 90 by 50-foot brick and steel structure, includes a large show room; a factory-designed parts stock room, set up to conform exactly with the Detroit Diesel Balanced Parts Stock Plan; and complete overhauling and repair facilities.

**General Motors Corporation,** Detroit, 23, Michigan, announces the appointment of Royce A. Hill, to Field Sales Engineer for the northern section of the Detroit Diesel Engine Division's Dallas region. Mr. Hill will be responsible for all industrial and petroleum distributors' sales activities for the territory which includes Oklahoma, northern Texas, and northern New Mexico.

**Hyster Company,** Portland 8, Oregon, has appointed Paul Rhodes to the position of Company Purchasing Agent. He will serve at the main office in Portland, Oregon.

**Caterpillar Tractor Company,** Peoria 8, Ill., has appointed R. J. Loskill Central Sales Division District Representative. He will serve the following "Caterpillar" distributors: Gibbs-Cook Tractor & Equipment Co. of Iowa; Halladay-Dettman Co. of South Dakota; Lincoln Equipment Co. of Nebraska; and Missouri Valley Machinery Co. of Nebraska.